ANALYSIS OF CHANGES IN THE CONTENT OF PHYSICIAN OFFICE VISITS

Deliverable 7:
Report on Revised NAMCS, Volume 1
Contract No. 232-81-0039

Submitted by:

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Health Resources and Services Administration
5600 Fishers Lane
Rockville, Maryland 20857

John Drabek, Project Officer

June 30, 1983

Total Project Cost: $229,862
Deliverable 7: $ 25,000

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Ms. Gene Roback of the American Medical Association allowed us to link physician characteristics with the NAMCS patient records, greatly enhancing the analytic power of the data base. We are very appreciative of her assistance in helping us do this.

Our thanks also goes to our Project Officer, Dr. John Drabek, for overseeing the project and for encouraging us to explore special research issues in more detail.

We would also like to thank our programmer, Ms. Ann Larsen, for transforming 250,000 visit records on over 8 reels of tape into an efficient analytic file capable of supporting all of the included analyses in a most cost-effective manner.

Last but not least, we owe a debt of gratitude to Linda DeMarco and Jean Widaman for typing, retyping, and retyping the manuscript, not to mention the 100-odd tables. Any remaining errors and omissions naturally reside with us.

JBM
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1.0 INTRODUCTION

1.1 Statement of the Problem and Objectives

The rapid escalation in medical care expenditures in the last 15 years no longer needs documentation. While hospital care continues to account for the lion's share of expenditures, physician services are running second. In 1965, the U.S. spent $8.5 billion on physician services alone; by 1980, this number increased more than five-fold to $46.6 billion (Stat. Abst., 1981). This represents an average annual increase of 11.3 percent. At least part of this increase can be attributed to general population growth and inflation. Table 1-1 presents increases in *per capita* expenditures for physician services, in both nominal and real terms. Even after adjusting for population growth and inflation, expenditures increased approximately 3 percent per year from 1965 to 1980.

If we decompose physician expenditures into utilization rates and fees, we observe that physician visit rates have increased only modestly over the time period, less than one percent per year. (See Table 1-1.) Of course, there have been major gains in utilization for some parts of the population (e.g., the poor and elderly) since 1965, but increases for the nation as a whole have been small. Physician fees, however, have increased rapidly over this time period, over 7 percent per year. The introduction of government sponsored health insurance programs and the growth in private health insurance, especially in UCR coverage, have undoubtedly been major factors in physician fee inflation, as discussed in detail elsewhere (Dyckman, 1978; Feldstein, 1970; Sloan, 1976, 1982; Steinwald and Sloan, 1974).

Another possible factor in rising expenditures is the growth in medical technology and increasing physician specialization. While the absolute *number* of visits may not have changed, the *content*, or *quality*, of those visits may have altered. Specialists are more likely to provide more sophisticated medical procedures during an office visit and to spend more time with each patient. In turn, they charge higher fees, which are justified both because of higher practice costs and on human capital grounds (longer specialist training). If the average office visit is longer and entails more ancillary services than in previous years, *and* we believe these changes are quality - enhancing, then simple visit rates may not be an adequate measure of physician output.

TABLE 1-1

INCREASES IN PHYSICIAN EXPENDITURES, UTILIZATION RATES, AND FEES

	Physician Expenditures per capita		Physician Visits per capita		Physician Fee Component of CPI
	Nominal	Real	Outpatient	Inpatient	(1967=100)
1965	$ 42.85	$48.52	4.3	1.0	88.3
1970	68.81	56.68	4.6	1.0	121.4
1975	114.66	67.80	5.1	1.1	169.4
1980	201.18	74.70	4.8	1.2	269.3
Average Annual Percent Increases 1965-1980	+10.31	+2.88	+0.73	+0.01	+7.43

Sources: Physician expenditures and fees - Statistical Abstract, 1981.

Physician visits, outpatient - NCHS Health Interview Surveys.

Physician visits, inpatient - NCHS Hospital Discharge surveys (assume one visit per day of short-term hospital care).

Of course, specialist visits are time/service-intensive in large part because these physicians are treating a sicker patient population. As specialists increasingly substitute for general practitioners in the delivery of primary care, their casemix should become less ill on average, thereby diminishing intensity increases somewhat over time. Available evidence has shown that many specialists, not only internists but general surgeons and cardiologists as well, already are providing considerable primary (non-specialty) care (Mendenhall _et al_., 1979; Rosenberg, 1975).

To date, however, there has been no time-series documentation of any such shifts in office visit content. This report seeks to provide this for the first time. Specifically, the following reesearch questions are addressed:

(1) How has office visit content changed over time as measured by length of visit and the diagnostic and therapeutic services provided?

(2) How does office visit content vary by:

  (a) physician specialty?
  (b) MD-DO?
  (c) Geographic location?

  How do these cross-sectional variations change over time?

(3) What changes do we observe over time in the physician's casemix?

(4) Are the time trends statistically significant? Are they still significant after holding specialty mix and casemix constant?

(5) How have treatment patterns changed over time within selected medical conditions (tracers)?

1.2 Summary of Findings

We sought to document whether such shifts in office visit content have occurred, using the 1974-1981 National Ambulatory Medical Care Surveys. Each year, data were collected on about 45,000 office visits, including patient characteristics, reason for visit, diagnosis, the length of visit, and the diagnostic and therapeutic services provided. In addition, data were available on the physician's specialty, characteristics, practice type, geographic location and whether he was an MD or DO. This is the first time, to our knowledge, that a nationally-representative time series of any length has been put together on what happens inside the physician's office.

1.2.1 Gross Trends in Visit Content

Table 1-2 summarizes all of the trends in visit content available from the NAMC surveys. Considerable year-to-year fluctuation is evident--particularly for the low frequency services. Dashes indicate that the service was not reported in a given year or reported in such a way as to be noncomparable with later years; brackets reflect a joint response for two or more services.

To determine whether the observed trends were statistically significant, regressions on a time trend variable were performed on each service.* These were done, first, in bivariate form, then stepping in a set of physician, practice, casemix, and locational characteristics.

The results are shown in Table 1-3. Gross changes reflect average annual changes in the length of visit or service, where statistically significant, based on Table 1-2, while net changes adjust for contemporaneous changes in the other characteristics.

Overall the nature of the average office visit has definitely changed.

- By 1981, the "typical" visit was nearly a minute longer than it was in 1974 (0.13*7=0.9 min).
- The physician was far more likely to conduct a limited exam (30%) while slightly less likely to do a general exam (9%).

The visit was longer, not because the physician was providing high-technology diagnostic services like ECGs, lab tests, or x-rays, but because he was performing more therapeutic services, especially "talking" therapies.

- The typical visit was more likely to include medical and diet counselling (89%), family planning (48%), office surgery (9%), and physiotherapy (109%).

There are a number of potentially offsetting effects that must be considered in analyzing these time trends, however. First of all, we know that specialists account for a growing share of all office visits, up from 57 percent in 1974 to 67 percent in 1981 due to the rapid decline in general practitioners. Since many specialists tend to have longer visits relative to GPs and to use more services per visit, we would expect increases in visit intensity over time for this reason alone. At the same time, the average specialist visit should be growing less complex as these specialists

*Immunizations and drugs had to be dropped because of major differences in service definition over time.

TABLE 1-2

CHANGES IN OFFICE VISIT CONTENT OVER TIME, NAMCS 1974-1981

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services (% of Visits)								
Limited Exam/History	--	51.3	51.9	56.3	61.8	63.0	63.8	64.9
General Exam/History	--	15.7	16.9	22.4	21.3	16.8	15.8	15.1
Clinical Lab Test	19.1	22.9	22.7	21.4	20.8	23.2	21.8	22.1
X-Rays	7.1	7.4	7.7	7.8	8.2	8.2	7.3	7.6
Blood Pressure Check	--	33.2	33.2	34.0	33.3	36.0	33.9	34.7
Pap Test	--	--	--	5.4	4.9	4.9	4.4	4.3
ECG	--	3.4	3.3	3.0	3.4	2.7	2.8	3.2
Endoscopy	--	1.2	1.2	1.2	1.0	1.3	0.8	1.0
Vision Test	--	4.7	5.2	4.0	4.8	6.0	5.7	5.8
Therapeutic Services (% of Visits)								
Immunization/Desens.	17.1	4.5	5.3	6.6	7.8	5.2	63.1	60.6
Injections		13.8	12.5	--	--	9.6		
Drugs-Prescription	44.6	44.3	42.8	53.6	51.8	46.8		
Drugs-Non-Prescription	5.0	--	--			4.5		
Office Surgery	--	6.7	7.1	7.9	7.7	7.4	7.5	7.3
Physiotherapy	--	2.2	3.0	3.3	3.6	3.1	5.1	4.6
Medical Counselling	--	12.3	13.6	20.6	19.4	22.2	23.2	22.9
Diet Counselling	--	--	--	6.9	7.4	6.0	8.5	7.6
Psychotherapy/ Therapeutic Listening	4.4	4.3	4.1	5.4	5.0	4.4	5.0	4.8
Family Planning	--	--	--	1.5	1.4	1.4	2.2	1.9
Length of Visit (minutes)	14.0	14.5	14.6	14.8	14.4	14.9	15.3	15.4

TABLE 1-3

SUMMARY OF GROSS AND NET TIME TRENDS IN OFFICE VISIT CONTENT

	Gross Change[a]		Net Change[b]	
	Annual	1974-81[c]	Annual	1974-81[c]
Length of Visit (mins.)	0.13	0.91	0	0
General Exam (%)	-0.23	-1.61	-0.44	-3.08
Limited Exam (%)	2.59	18.13	2.68	18.76
Lab Tests (%)	0	0	0	0
X-Rays (%)	0	0	0	0
ECGs (%)	-0.08	-0.56	-0.12	-0.84
Vision Tests (%)	0.21	1.47	0	0
Pap Tests (%)	-0.27	-1.89	-0.26	-1.82
Office Surgery (%)	0.10	0.70	0	0
Counselling (%)	2.46	17.22	2.16	15.12
Family Planning (%)	0.18	1.26	0.18	1.26
Physiotherapy (%)	0.40	2.80	0.39	2.73

[a]Total change per year.
[b]Change per year, holding specialty, casemix, and other characteristics constant.
[c]Column gives annual change projected over seven years.

increasingly substitute for GPs in providing (routine) primary care. This would tend to offset, or at least attenuate, any intensity increases resulting from increasing specialization.

Second, trends towards group practice, the influx of female physicians, and locational shifts in supply all have an effect on the length and content of office visits (as summarized below).

Finally, there is the possibility that patients are healthier now and require less physician time to treat. In order to hold casemix complexity constant in our analyses, a physician casemix index was developed using multiple regression coefficients from a length of visit equation as weights. Based on this regression,

- no trend in office casemix complexity was evident over our time-series (1974-1981).

Thus, a changing casemix per se cannot explain the gross trends toward a longer, more intensive visit in the two tables.

Once we hold changing specialty mix and other patient, practice, and physician characteristics constant, a few of the time trends turn insignifican (see column 3, Table 1-3). In particular, there is no net change in length of visit, implying that the specialization trend (among others) explains why visit lengths are increasing. That no time trend in casemix was found further reinforces this conclusion of a supply side effect.

Positive time trends in vision tests and office surgery also become insignificant once we hold specialty distribution constant. Ophthalmologists increased their relative share of office visits from 4.2 to 5.4 percent, and it is this shift which apparently explains the gross trend in vision tests. Many specialists, including dermatologists, perform office surgery at a greater rate than GPs, resulting in more surgery with specialization.

Declines in general exams and ECGs actually become larger once we adjust for specialty shifts. Because specialists are more likely to provide these two services, compared with GPs, and because their visit shares are growing over time, the gross trends are biased toward zero.

Summarizing so far, where the gross and net time trends in Table 1-3 are similar, we can say that the trend (if any) has permeated most practice types and specialties. Thus,

- general exams are falling slightly everywhere as a percent of all visits, while

- limited exams and counselling, on the other hand, have been rapidly growing in frequency thoughout physicians' offices.

Where the two columns differ, we can attribute it to changes in physician-practice characteristics. We have already noted the growing supply of ophthalmologists in explaining the growth in vision tests. Clearly,

- longer visits are not found among all physicians, but rather are explained by growing specialization, referrals, and shifts in practice setting.

1.2.2 Specialty-Shift Effects

How much of the gross trends can be explained by greater specialization? Furthermore, how do the specialties differ in their visit content over time?

Primary Care Physicians

Based on NAMCS, primary care physicians are increasing visit lengths about 4 seconds/year, *ceteris paribus*. Practice patterns otherwise are generally comparable with those of the sample as a whole. Within primary care, however, we observe considerable variation by specialty. Of particular interest for policy purposes are family practitioners. Not only are they the fastest growing specialty (over a three-fold increase in office visit shares), but their treatment patterns are changing over time in different ways from those of other primary care physicians.

- Increasing visit lengths are primarily attributable to FPs, for example, who are spending a full 20 seconds more per patient every year, or almost 2 1/2 minutes more in 1981 than in 1974.

Like their primary care colleagues, FPs are performing more limited exams, more counselling and more physiotherapy, but unlike other physicians, FPs are not reducing their use of Pap tests, ECGs, and general exams. In part, these different trends undoubtedly reflect the fact that FPs themselves are changing. While similar to GPs in practice patterns at the beginning of the time-series, they resemble other primary care specialists by the end of the period, a transformation that undoubtedly reflects the increasing number of residency-trained FPs.

Somewhat surprisingly, the trend toward more in-office surgery is evident, not among general surgeons or even among general or family practitioners, but rather,

- it is OB-GYNs and pediatricians who are performing significantly more office surgery over time.

This may help explain the declining visit lengths of pediatricians, given the type of simple surgery involved (e.g., removal of sutures). By contrast, OB-GYN office surgery is considerably more complex (e.g., D and Cs, cauterization/cryotherapy), and increases over time may reflect a shift in the locus of treatment from hospital to office.

Medical Specialists

Medical specialists differ from most primary care physicians in that they appear to be shortening their visits at the relatively rapid rate of over 14 seconds per year. This is particularly surprising since they are not cutting back on time-consuming services such as general exams and are actually doing more counselling. Why this should occur is unclear, especially since we have held any trend towards a simpler casemix constant. If this trend continues, it will provide a major offset to increasing visit lengths among FPs.

Surgical Specialists

Surgical specialists are ordering more x-rays and providing more vision tests over time. Although we cannot test it directly due to small sample sizes, these trends appear to reflect changes in the visit content of orthopedic surgeons and ophthalmologists, respectively. Other trends, such as the substitution of limited for general exams and the increased use of physiotherapy, are consistent with those of physicians generally. Unlike surgical specialists as a whole, however,

- general surgeons are spending significantly more time with their office patients, 10 seconds more per year.

These longer visits are apparently spent counselling more of their patients and performing more of both kinds of exams. General surgeons have been increasing the rate at which they perform general and limited exams by 6 percent per year. Why are general surgeons changing the nature of their office visit? One explanation is that they may be entering the primary care market under competitive pressure of over-supply.

Psychiatrists

Finally, despite high absolute levels to start with (90%), psychiatrists are also counselling an increasingly larger share of their patients over

time. Even so,

- psychiatrists are spending less time with patients; visits are shortening at the rate of 20 seconds per year, or almost 2 1/2 minutes by 1981.

This probably reflects the erosion of the "50-minute" psychotherapy hour to something closer to 45 minutes.

1.2.3 Physician and Practice Effects

Although our analysis has focussed on time trends, cross-sectional differences in how physicians treat patients are of interest in their own right.

Women Physicians

- Women physicians spend far more time with their patients, 2.22 minutes more on average compared with men physicians.

Although previous studies have found similar differences (Langwell, 1982; Mitchell, 1982), they were unable to hold casemix constant. This analysis confirms that more serious diagnoses, or a differential mix of new and old patient visits, cannot explain the sexual difference in visit length. Does this mean that women physicians are providing a higher quality visit? By linking NAMCS data with physician characteristics for the first time, we now know what women physicians are doing during these longer office visits. They are providing more general exams, more counselling, and more family planning, all services expected to be time-consuming. In addition, women physicians are more likely to order lab tests and Pap tests than are their male colleagues, even holding patient sex and medical problems constant. Furthermore, they order or provide the remaining diagnostic and therapeutic services just as frequently as men do.

Board-Certification

By virtue of their training and credentials, we would expect board-certified physicians to provide more time- and service-intensive office visits compared with physicians who are not board-certified. At the same time, they may face a greater demand for their services and be more efficient clinicians, both of which would tend to shorten their visits.

The net impact of these offsetting effects appears to be zero, as board-certified physicians do not spend any more time with their patients, even though they are significantly more likely to counsel them. Ancillary use is definitely more intensive, however.

- Board-certified physicians order or perform lab tests, x-rays, ECGs, Pap tests, and office surgery far more frequently than other physicians, again holding casemix constant.

Older Physicians

The practice of older physicians is characterized by longer visits spent performing general exams and office surgery and less reliance on diagnostic testing. As the physician stock becomes younger (due to the tremendous influx of new graduates), we may find an increasing substitution of ancillary services for visit time.

Solo Versus Group Practitioners

It had been hypothesized that solo physicians would have longer, but less service-intensive, visits than those in group practice, as the latter may be better able to improve their productivity by substituting aide time and internalizing production of ancillaries. This in fact appears to be the case.

- Solo physicians spend about 1/3 of a minute longer with their patients, apparently because they are apt to perform general instead of limited examinations.

Most strikingly,

- physicians who practice alone order substantially fewer of all types of services compared with those in group practice. The differences, furthermore, are considerable: 13 percent fewer lab tests and 35 percent fewer x-rays, for example.

MDs Versus DOs

To our knowledge, this is the first time that practice styles of MDs and DOs have ever been compared using national data. The results show that the two types of physicians are indeed different. Even holding casemix and specialty constant,

- DOs spend 2/3 of a minute longer with their office patients than do MDs. These longer visits involve significantly fewer diagnostic services.

Since DOs are no more likely to counsel patients than MDs, we can attribute their longer visits to the use of physiotherapy (in this instance, "manipulative therapy," the unique treatment modality performed by DOs) which they provide in 16 percent of their office visits compared with only 3.7 percent of MD visits.

Visit lengths also appear to vary systematically by region and urban/rural location, holding casemix, etc. constant. A tripartite grouping of regions by visit length was discovered with the

- North Central region having the shortest visits on average; the Northeast and South a minute longer; and the West nearly 2 minutes longer, *ceteris paribus*.

Visits in the Northeast are longer because physicians perform more general exams and office surgery, while Western physicians do fewer exams of all types but spend more time in office surgery and in counselling their patients. In the South, on the other hand, the emphasis is on general exams involving a range of diagnostic services. Southern physicians provide more lab tests, x-rays, and ECGs than physicians practicing outside the South.

As expected,

- physicians in rural areas spend less time with patients on average, performing fewer general exams and fewer diagnostic services of all types, even adjusting for casemix, solo-group practice, and physician age.

Despite their shorter visits (due presumably to heavier workloads), rural physicians are just as likely as their urban colleagues to provide counselling and family planning services. In-office surgery rates are actually higher in these non-metropolitan areas, possibly because of the greater distances between office and hospital.

1.2.4 Results from Ten Tracer Conditions

We know that specialists are increasingly substituting for GPs, and that the content of office visits is changing as a result. We also know that specialists' visits are much more time- and service-intensive than those of GPs, even holding casemix constant. This suggests that different specialists may treat the same patients differently, either by virtue of their training or for reasons unrelated to patient illness. In order to examine this more closely, we selected ten "tracers" and compared treatment patterns within each tracer. These tracers included six based on diagnosis (prenatal care, well

baby, otitis media, hypertension, chronic ischemic heart disease, and diabetes) and four based on the patient's reason for visit (abdominal or stomach pain, back problems, headache, and anxiety/nervousness).

A set of descriptive tables were prepared on each tracer showing (a) the changing specialty mix in treating the problem, (b) the changing mix of diagnostic and therapeutic services, and (c) how the treatment mode varied by specialty. Then, three regressions were run on each tracer, one analyzing the probability of seeing a specialist, one explaining variations in length of visit, another explaining resource intensity. An intensity index was constructed, based on a weighted sum of diagnostic and therapeutic services, with relative prices as weights. In the regressions, patient sex, age, race, new-returning status, and secondary diagnosis were also held constant.

Based on these analyses, we can address two interesting policy questions:

- How do physicians differ in their treatment of a specific problem, depending on cross-sectional differences in specialty, training and location?

- How have the treatment modes for these problems changed over time?

Cross-Sectional Differences

First, even within a narrowly defined tracer, specialists still differ considerably in the time they spend with patients and the kinds of services they order or perfrom. Internists, for example, spend 4-7 minutes longer with patients than GPs (4 minutes longer for diabetics; 5 minutes more for headaches; 7 minutes longer counselling anxiety patients). FPs spend 1-2 minutes more than GPs treating expectant mothers and small children with simple problems, but 1-2.5 minutes less with acute and chronic patients. As expected, cardiologists spend over 5 minutes longer with hypertension and ischemic heart disease patients, as do ophthalmologists with headache and diabetic patients.

Internists, cardiologists, and other specialists also exhibit a much more intensive visit based on our resource intensity index. OB-GYNs and general surgeons are a notable exception to this rule, however, showing no systematic differences from GPs in treating the identical problem. (OB-GYNs spend more time with expectant mothers and treat them more intensively than GPs, however).

Board-certified physicians show an interesting treatment pattern by illness, given earlier findings on patients generally. Apparently, the lack of correlation between certification and length of visit is due to offsetting effects. They tend to spend a minute less with pregnant women and young

children, but 1-2 minutes more with chronically and acutely ill adults. Their resource intensity, however, is consistently greater, which we would expect if they are running more tests and performing more complicated therapies.

As to location, the same tripartite pattern in length of visit (i.e., NC<NE,S<West) holds up for most problems. Chronic illnesses are an exception in that Western physicians do not spend any longer with patients than those in the North East and South. So are anxiety patients, where visits in the South are 2 minutes longer than anywhere else. (This is true even holding psychiatric specialty constant.)

Temporal Trends

The most dramatic changes in treatment have occurred in the two preventive tracers: prenatal and well baby care. These visits are becoming longer and more intensive over time, above and beyond those changes we would expect as a result of specialty shifts alone. In fact, well baby care is the only one of our tracers not to show a substitution of specialists for general and family practitioners, presumably because it is so dominated by pediatricians to start with.

Physicians as a whole are spending more time with patients in all of the remaining tracers (except diabetes), and sometimes providing more services as well. For many of these conditions, however, treatment has changed because the physicians themselves have changed. Once we account for the displacement of GPs by specialists, visits are significantly longer only in two other tracers (otitis media and stomach pain), and more service-intensive in three more (chronic ischemic heart disease, back problems, and anxiety).

Even more surprising are the declining rates of ancillary use in several tracers. Physicians are actually ordering fewer, or a less expensive mix, of services in their otitis media and headache visits, *ceteris paribus*.

The chronic diseases (hypertension and diabetes) show the least net changes in visit content over time, possibly because the mode of treatment has changed very little over time. They are also the two tracers with the highest concentration of general and family practitioners. Nevertheless, hypertension and diabetes visits are increasingly being dominated by internists, and we may observe treatment changes in the long-run.

1.3 Overview of Report

Our report follows in five chapters. Chapter 2 provides a detailed discussion of the National Ambulatory Medical Care Surveys that constituted

our data base: sample design, survey instruments, data aggregation, etc. A technical discussion of design effects is included in Appendix A, and copies of all NAMCS questionaires in Appendix B. Chapter 2 also presents some original analyses of reliability and validity issues in the NAMCS.

Chapter 3 presents descriptive time trends for all dimensions of office visit content. This chapter is in three parts. First, national trends in office length of visit and diagnostic and therapeutic services are presented. This is followed by a specialty breakdown of the same data, and then a regional decomposition.

Changes in the diagnostic content of physicians' practices over time are shown in Chapter 4. The development of the casemix index is then described and time trends in the index presented by specialty and geographic location.

The statistical significance of observed time trends in office visit content is tested in Chapter 5, using multiple regression techniques. Length of visit and ancillary service equations were estimated first for the entire sample, and then for separate specialty groups.

Changes in treatment patterns for ten selected "tracer" conditions are presented in Chapter 6. This chapter is in two major parts. First, descriptive time trends are presented for the specialty mix treating the tracer, as well as for all dimensions of visit content. Then, these trends are tested using multiple regression and probit techniques.

2.0 NATIONAL AMBULATORY MEDICAL CARE (NAMC) SURVEYS

2.1 Overview

The NAMC surveys provide an excellent data base for examining the resources associated with different types of office visits. They are unique in containing not only visit characteristics, such as visit length and use of ancillaries, but patient casemix information as well. Each survey is a nationally representative sample of office-based physicians, including both MDs and DOs. Physicians were asked to complete a questionnaire on a systematic random sample of visits over the course of a one week period. Each survey year includes data on approximately 45,000 patient visits.

We have analyzed all of the available NAMC surveys, spanning an eight year time-series 1974-1981.* These surveys include data on 15,349 physicians, or approximately 2,000 in each year, including 60-90 DOs.

2.2 Sample Design

Each NAMC survey is a nationally representative sample of office-based physicians including both MDs and DOs. Federal physicians and physicians specializing in anesthesiology, pathology, or radiology were specifically excluded from the NAMC survey. A multi-stage probability design was used by NCHS that involved three stages: (1) the selection of primary sampling units (PSUs), (2) physician practices within PSUs, and (3) patient visits within practices. In the first stage, a sample of PSUs was selected which were representative of the four major census regions and SMSA and non-SMSA areas. In the second stage, a probability sample of office-based physicians was selected based on the universe of all physicians, both MDs and DOs. Physicians were sampled out of nine specialty groups: general and family practice, internal medicine, pediatrics, other medical specialties, general surgery, OB-GYN, other surgical specialties, psychiatry, and all other specialties. As discussed in the next subsection, this phase of the NAMC sample design introduces potential problems of specialty sample sizes. In the third stage, actual patient visits were selected within the physician's practice. Each survey physician provided information on approximately thirty unique patient visits, although the actual number of sampled visits varied as

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*In earlier work (see our Preliminary NAMCS Report under this contract), we had included the initial 1973 survey in our analysis. After consultation with NCHS, it was decided that this year suffered from start-up difficulties and it was dropped from the study.

a function of physician caseload. Physicians with small medical practices might provide information on every patient seen during a seven day period, while those with larger practices provided information on one out of three patients, for example, or one out of five.

Table 2-1 shows total samples within each of the nine specialty groups by year. Response rates averaged at least 70 percent. Together survey physicians completed information on approximately 45,000 unique patient visits in each year. In order to provide estimates of the total number of patients seen in physicians' offices annually, NCHS has devised a weight that is associated with each sampled visit. This weight takes into account the probabilities of selection as well as an adjustment for non-response. For any given physician, the weight is the same. Based on the 1981 NAMC survey, for example, NCHS estimates that 585.2 million office visits were made to physicians.

2.3 Sample Sizes

Because NAMC did not stratify by individual specialty but rather by nine specialty groups, sample sizes are very small for the other medical and other surgical specialties. For example, a sample of allergists or a sample of cardiologists were not selected from the universe of all physicians, but rather a sample of medical specialists. This includes not only allergists, cardiologists, dermatologists, but also all other physicians in this group such as gastroenterologists, hematologists, specialists in pulmonary disease or infectious disease, etc. As a result, the absolute number of physicians sampled within any of those specialties tends to be very low and also fluctuates markedly from year to year of the survey. We observe a similar problem with the surgical specialties.

Table 2-2 gives an example of this problem, using the 1979 NAMC survey: it presents the number of physicians sampled (or an estimate in the case of the other medical and surgical specialties), the number of visits on which data were collected by each specialty, and the percent of all visits that these represent. This last column is weighted, using the NCHS weights described above, to provide a nationally representative distribution of specialty mix. Here it can be seen that while several hundred (or even as many as 2,000) visits were sampled for each of these subspecialties, they are based on a very small number of physicians. Thus if only two or three physicians had an unusual practice style or casemix, they could affect mean values for their specialty.

TABLE 2-1

PHYSICIAN SAMPLE SIZES BY SPECIALTY BY YEAR

Specialty	Year 1974	1975	1976	1977	1978	1979	1980	1981
General and Family Practice	467	610	484	438	424	394	388	337
General Surgery	208	286	226	217	184	171	171	125
Internal Medicine	263	347	265	266	266	247	281	221
OB-GYN	172	233	183	174	162	156	184	147
Pediatrics	136	172	136	135	131	140	139	124
Other Medical	138	137	126	124	114	134	108	123
Other Surgical	343	433	385	372	356	323	282	303
Psychiatry	154	190	154	142	147	154	146	116
Other	55	64	45	64	66	64	181	53
Total	1936	2472	2004	1932	1850	1783	1870	1547

TABLE 2-2

DISTRIBUTION OF NAMCS PHYSICIANS AND VISITS BY SPECIALTY: 1979

Specialty	N of Physicians Sampled	N of Visits	Percent of Visits (weighted)
General/Family Practice	394	12,005	34.2%
General Surgery	171	3,476	6.1
Internal Medicine	247	5,933	12.0
OB-GYN	156	4,003	9.1
Pediatrics	141	4,828	10.5
Allergy	11*	430	1.4
Cardiology	42*	837	1.4
Dermatology	33*	911	3.2
Other Medical	48*	842	1.2
Ophthalmology	81*	2,347	5.5
Orthopedic Surgery	98*	2,227	5.6
Otolaryngology	31*	750	1.8
Urology	56*	1,115	1.7
Other Surgical	57*	905	1.4
Psychiatry	154	3,466	3.1
Other	64	1,276	2.0
Total	1783	45,351	100.0%

* Estimates only

2.4 The NAMCS Questionnaire

2.4.1 Description

The NAMC surveys contain a wide range of information on every physician sampled, as well as on each visit he or she provided during the survey week. Briefly, the data include gender, age, and the specialty of each physician also, whether (s)he is board certified, in solo or group practice, and practice location (region of the country, SMSA/non-SMSA).* Even more data are available for each individual visit:

- age, sex, race of patient
- patient's reason for visit (up to 3 reasons)
- whether the patient was referred by another physician
- whether the physician had seen this patient before, and if so, if it was for the same problem
- time spent (in minutes) in direct contact
- checklist of diagnostic and therapeutic services ordered or provided
- disposition (return appointment, refer elsewhere, admit, etc.)

Appendix B includes a copy of the questionnaire used in each survey year.

The number of ancillary services recorded in the NAMC survey has varied considerably over the eight year period, ranging from nine different services in 1974 to as many as 20 different kinds in 1979 (see Table 2-3). Many of the services we are most interested in have been included for all years, e.g., x-rays, laboratory tests, office surgery. For some other services which were added as late as 1977, however, like Pap tests or diet counselling, it will be more difficult to establish a reliable time trend. Finally, in some instances, a service (nonprescription drug, injections) was dropped from the survey and then added back in, often in a very modified form. This makes it virtually impossible to estimate time trends.

The NAMC survey collects ancillary services data on all services prescribed by the physician, even if he does not actually provide them. This provides a more comprehensive description of the visit, as the physician must interpret all test results and incorporate them into his treatment plan, regardless of whether the test was done in his office or in an outside laboratory. Unfortunately, we cannot determine the volume of services from the NAMC survey, only whether at least one service of a given type was

*Physician sex, age, and board-certification status are not part of the NAMCS public use tapes. They were obtained for purposes of this project under special agreement with NCHS.

TABLE 2-3

AVAILABLE NAMCS DATA ON OFFICE VISIT CONTENT

	1974	1975	1976	1977	1978	1979	1980	1981
DIAGNOSTIC SERVICES								
Limited History/Exam		X	X	X	X	X	X	X
General History/Exam	X	X	X	X	X	X	X	X
Pap Test				X	X	X	X	X
Clinical Lab Test	X	X	X	X	X	X	X	X
X-ray	X	X	X	X	X	X	X	X
Blood Pressure Check		X	X	X	X	X	X	X
ECG		X	X	X	X	X	X	X
Vision Test		X	X	X	X	X	X	X
Endoscopy		X	X	X	X	X	X	X
THERAPEUTIC SERVICES								
Drug (Prescription)	X	X	X	X	X	X	X	X
Drug (Non-Prescription)	X			X	X	X	X	X
Injection	X	X	X			X	X	X
Immunization/Desens.	X	X	X	X	X	X	X	X
Diet Counselling				X	X	X	X	X
Family Planning				X	X	X	X	X
Medical Counselling	X	X	X	X	X	X	X	X
Physiotherapy		X	X	X	X	X	X	X
Office Surgery	X	X	X	X	X	X	X	X
Psychotherapy	X	X	X	X	X	X	X	X
LENGTH OF VISIT	X	X	X	X	X	X	X	X

NOTE: Bracketed Xs, [X X], indicates that the items were combined into one response for the respective year.

ordered. Thus a documented increase in the percent of visits involving x-rays cannot be used to derive an estimate of the change in total outpatient x-rays. For the majority of the diagnostic and therapeutic services this is not a problem; only one Pap smear or one blood pressure check would be performed during a given visit, for example. We explore the extent of potential underestimates in more detail in Section 2.6.

Ideally we would like to include nonphysician labor inputs in our analysis of office visit content. While the NAMC surveys have collected data on the number and type of auxiliary personnel employed by the physician (e.g., R.N., technician, etc.), these variables have not yet been released by NCHS for external use.

2.4.2 Compatibility of Reason for Visit and Diagnosis Codes

In our analyses, it is key that we are able to hold casemix constant. How much of observed service intensity increases are due purely to quality improvement and how much to casemix shifts? Changes in casemix expected to be associated with more intensive office visits could result both from ongoing secular trends, such as a growing elderly population, or from shorter-run fluctuations, such as a flu epidemic. We developed a casemix index based on patient characteristics, including both diagnosis and reason for visit. (This index is described in detail in Chapter 4.) Before we could do this, however, we had to make both the diagnostic and the reason for visit codes compatible over the time series.

NCHS changed their coding scheme for reason for visit beginning in 1977. Prior to 1977, they used a schema known as Symptom Classification. This classification system coded the patient's symptoms or complaints primarily based on their anatomical site (e.g., nervous system, digestive, etc.). For preventive and other nonsymptomatic visits, NCHS included codes for the purpose of the visit, e.g., pregnancy exam, allergy tests, etc. Almost 200 different codes were included in all. After a few years experience with the NAMCS, NCHS staff felt that more detail was needed, especially for nonsymptomatic visits, and a new classification scheme was devised. Known as the Reason for Visit Classification (RVC), this system is organized around seven modules representing the patient's reason for visit: (1) symptoms; (2) disease; (3) diagnostic, screening, and preventive; (4) treatment; (5) injuries; (6) test results; and (7) administrative. The RVC includes over 400 different codes.

In order to do time-series work, the two different coding systems must be made compatible. Consultation with NCHS revealed that no cross-reference of the two systems exists. Based on frequency distributions of reason for visit in two years of the time-series (1975 and 1978, each based on a different coding scheme), we identified the most common patient problems encountered in each year. This process was then repeated by individual specialty to make sure that a common problem treated by one of the smaller specialties was not omitted. A common list of top problems (47 in all) was identified along with both their symptom codes and RVC codes (see Table 2-4). These patient problems account for almost three-fourths of all visits. In a few instances, finer levels of detail in the RVC classification had to be sacrificed in order to make the two systems compatible, but these were generally of a trivial nature for our purposes. For example: The RVC distinguishes eye infection from other abnormal sensations of the eye, while the Symptom Classification combines them as pain/irritation of the eye (see problem #25).

As a rule, the percent of visits attributed to a given patient problem do not appear to fluctuate markedly between 1975 and 1978. A notable exception, however, is a general medical exam (#2); while slowly increasing over time, it jumps dramatically from 1977 to 1978. Since the RVC was first used in 1977, the increase can not be due to a change in the classification system. Thomas McLemore of the Ambulatory Care Statistics Branch of NCHS believes it is due (at least in part) to a change in the training of coders. NCHS internalized the coding function while previously it had been done by the outside contractor responsible for data collection.

The coding scheme for diagnosis also changed over the 1974-81 period. For all of the survey years prior to 1979, the ICDA-8 diagnostic coding system was used. Beginning in 1979, however, NCHS switched to the latest edition: ICDA-9. These coding systems were made compatible using the cross-reference system developed by Schneeweiss et al. (1983).

Schneeweiss et al. also used NAMC data to develop a set of "diagnostic clusters" to facilitate analysis of ambulatory care visits. (These clusters, representing clinically meaningful diagnostic groups, form the basis of our casemix index.) Although the authors originally identified ninety diagnostic clusters, only the top sixty are specified explicitly in our index; the remaining clusters were grouped together in a residual category. These top sixty diagnostic clusters, shown in Table 2-5 (for 1978 only), represent over three-quarters of all physician visits.

TABLE 2-4
COMPATIBILITY OF NAMCS PATIENT PROBLEM CODES

	Patient Problems	SX Codes	1975 %	RFV Codes	1978 %
1.	Surgical aftercare	986*	4.6	4205, 4540, 4545, 4555	3.3
2.	General medical exam	900, 901	4.1	3100, 7100-7140	8.0
3.	Pregnancy exam	905	3.9	3200, 3205, 3215	4.2
4.	Pain/injury, upper and lower extremities	400, 405	6.3	1915-1960, 5020-5045, 5115-5130, 5525-5570	6.7
5.	Pain/injury, back & neck	415, 410	4.3	1900-1910, 5005-5015, 5105, 5110, 5505, 5515	4.2
6.	Sore throat	520	2.7	1455.0-1455.5	3.0
7.	Abd. pain/stomach pain	540, 541	2.6	1545, 1550	2.0
8.	Cough	311	2.4	1440	2.6
9.	Visit for medication	910	2.1	4100, 4110, 4115, 3400	2.6
10.	GYN exam	904	2.0	3225, 3365	1.3
11.	Fatigue	004	1.8	1015, 1020	1.1
12.	Headache	056	1.8	1210, 2365	1.6
13.	Skin problems (allegic & non-allergic)	112,113,115, 120	4.1	1860-1880, 2825	3.5
14.	Acne	100	0.6	1830	0.9
15.	Chest pain	322	1.7	1050, 1265	1.7
16.	Cold/flu	312, 313	2.2	1445, 1450	2.1
17.	Well baby exam	906	1.5	3105	0.9
18	Earache	735	1.4	1355	1.7
19.	Other ear symptoms	737, 740	>0.6	1360, 1365, 5620	0.8
20.	Hearing dysfunction (includes deafness)	731, 730	unk	1345	0.4
21.	High blood pressure	205	1.4	2510	1.3
22.	Skin wounds	116	1.3	5405-5430, 5705-5760, 5205-5230, 5305-5325	1.3

TABLE 2-4 Cont'd
COMPATIBILITY OF NAMCS PATIENT PROBLEM CODES

	Patient Problems	SX Codes	1975 %	RFV Codes	1978 %
23.	Eye exam	908*	1.2	3230	1.1
24.	Vision dysfunction (includes blindness)	700, 701	>1.2	1305, 2405	1.6
25.	Pain/irritation eye	705	0.5	1315, 1320	0.6
26.	Fever	002	1.2	1010	1.5
27.	Vertigo	069	1.1	1225	1.0
28.	Weight gain	010	1.0	1040	1.4
29.	Shortness of breath	306	1.0	1415, 1420	0.9
30.	Vaginal discharge	662	0.9	1760	0.3
31.	Anxiety/nervousness	800, 810	1.2	1100	1.0
32.	Depression	807	0.8	1110	0.8
33.	Nasal Congestion/ Sinus problem	301, 304	1.2	1400, 1410	1.2
34.	Painful urination	604	0.7	1650	0.4
35.	Menstrual disorders (includes menopause)	653, 650	>0.6	1730-1740, 1750	0.7
36.	Nausea/vomiting	572	0.6	1525, 1530	0.8
37.	Diabetes	991*	0.5	2205	0.7
38.	Arthritis	427*	0.5	2900	0.5
39.	Hayfever/allergy	329	0.5	2635, 1090	0.7
40.	Situational problems	941	0.5	4700-4740	0.4
41.	Warts	111	0.5	1850	0.4
42.	Diarrhea	555	0.4	1595	0.4
43.	Nocturia	601	0.4	1645, 1655	0.5
44.	Other urinary sxs (includes kidney stones)	620	unk	1680, 2705	0.1
45.	Family planning	930-932, 935	unk	3500-3530	0.8
46.	Lump in breast	680	unk	1805	0.3
47.	Medical counselling	940	0.1	4600, 4605	0.6
	Total		>72.7		73.3

*In 1973-74, these problems were subsumed under larger categories (e.g., "progress visit-unspecified"). They were distinguished based on the appropriate diagnosis.

TABLE 2-5

MAJOR NAMCS DIAGNOSTIC CLUSTERS

Diagnostic Clusters	Percent of All Visits (1978)
1. General Medical Examination	8.72
2. Acute Upper Respiratory Infection	6.89
3. Prenatal and Postnatal Care	4.41
4. Hypertension	4.27
5. Nonpsychotic Depression/Anxiety/Neuroses	2.84
6. Lacerations, Contusions and Abrasions	2.70
7. Medical and Surgical Aftercare	1.84
8. Ischemic Heart Disease	2.49
9. Acute Sprains and Strains	2.51
10. Acute Lower Respiratory	2.35
11. Otitis Media	2.29
12. Dermatitis and Eczema	2.25
13. All Fractures and Dislocations	1.90
14. Chronic Rhinitis	2.13
15. Diabetes Mellitus	1.48
16. Degenerative Joint Disease	1.57
17. Refractive Errors	1.75
18. Acne	1.59
19. Urinary Tract Infection	1.28
20. Malignant Neoplasms	1.39
21. Vaginitis/Vulvitis/Cervicitis	1.11
22. Obesity	1.08
23. Benign and Unspecified Neoplasm	0.96
24. Bursitis, Synovitis, Tenosynovitis	0.99
25. Infectious Diarrhea, Gastroenteritis	0.92
26. Nonfungal Infections of Skin and Subcutaneous Tissues	0.87
27. Low Back Pain Diseases and Syndromes	0.74
28. Sinusitis Acute and Chronic	0.90
29. Peptic Diseases	0.87
30. Asthma	0.95
31. Menstrual Disorders	0.75

TABLE 2-5 Cont.

MAJOR NAMCS DIAGNOSTIC CLUSTERS

Diagnostic Clusters	Percent of All Visits (1978)
32. Cataract/Aphakia	0.84
33. Fibrositis, Myalgia, Arthralgia	0.56
34. Headaches	0.63
35. Schizophrenia and Affective Psychosis	0.64
36. Conjunctivitis/Keratitis	0.60
37. Viral Warts	0.61
38. Prostatic Hypertrophy/Prostatitis	0.51
39. Hemorrhoids and Other Conditions	0.53
40. Contraception	0.71
41. Menopausal Symptoms	0.51
42. Thyroid Disease	0.50
43. Sexually Transmitted Disease/Pelvic Inflammatory Disease	0.44
44. Peripheral Neuropathy-Neuritis	0.40
45. Personality Disorders	0.38
46. Viral Exanthems	0.39
47. Vertiginous Syndromes	0.38
48. Glaucoma	0.47
49. Iron Deficiency and Other Deficiency Anemias	0.45
50. Cerebrovascular Disease	0.39
51. Rheumatoid Disease	0.37
52. Otitis Externa	0.34
53. Skin Keratoses	0.38
54. Cardiac Arrhythmia	0.34
55. Emphysema, Chronic Bronchitis, COPD	0.30
56. Cholelithiasis/Cholecystitis	0.30
57. Wax in Ear	0.25
58. External Abdominal Hernias	0.34
59. Chronic Cystic Disease of Breast	0.28
60. Malignant Neoplasms of Skin	0.30

Source: Schneeweiss, _et al_. (1983).

2.5 Creation of the Aggregate Physician File

2.5.1 Identifying the Physician

All NAMC surveys collected data at the visit level, averaging about 45,000 visits per year. For eight years the complete file would contain over 350,000 observations, making data processing prohibitively expensive. To improve efficiency, we aggregated visits in each year to the physician level as best we could given the lack of a unique physician identifier (suppressed by NCHS to preserve confidentiality). Other aggregates were possible, e.g., regional localities, but the physician level permits the most flexibility in analysis.

Aggregating visits by physician is still possible to a first approximation given the other physician descriptors on each visit, These descriptors include:

- o age and sex
- o specialty (over 60 codes in 1979), MD/DO status
- o board-certification
- o type of practice (solo, group)
- o region (Northeast, North Central, South, and West)
- o SMSA/non-SMSA
- o patient (or visit) weight.

Whenever one of these characteristics varies on the file, we know we are encountering a new physician.

Because they are the most variable, specialty, age, and patient weight provide the most discriminating power. As discussed previously, the patient weight is the same for every visit in a physician's practice, based on the joint probability of the physician being in the sample and the patient being chosen from the physician's own caseload. It is still possible, however, for two or more physicians to have the same patient weight if they (a) have the same specialty, (b) practice in the same region, and (c) see roughly the same number of patients per week. If no two physicians with exactly the same characteristics appeared on the file, then all visits could be uniquely aggregated by physician. Unfortunately, such is not always the case; hence, physician aggregates (they could be called pseudo-physicians) are only a first approximation.

The number of real physicians "lost" in this aggregation process ranged from as many as 17 percent in 1975 to as few as 1 percent in 1980 and 1981. One reason why we may have been more sucessful in the last few years of the survey is that physician characteristics, like age, sex and board certification, were less likely to be missing in those years. Table 2-6

compares the number of physicians actually responding to the NAMC Survey in one representative year, 1979, with the unweighted number derived from our algorithm.* Although 1,783 physicians responded, we were able to identify only 1,522 different physicians, a loss of 15 percent. In other words, 261 physicians remain grouped with other physicians on our file rather than appearing separately. The extent of over-aggregation did not vary substantially across the major specialties, however.

For purposes of our analysis, however, this over-aggregation is unimportant, for grouped physicians include only those of identical specialty, type of practice, region, SMSA/non-SMSA, and (approximate) practice size. Moreover, because all analyses use a weighting scheme based on the patient weight times the number of reported visits, any multi-physician aggregate receives extra weighting in proportion to total visits. The same national estimates are produced, as if the visits had not been aggregated. Clearly, size distributions of total visits by physician would be inappropriate with such a file, but all analyses that follow are concerned only with the average visit (e.g., length, percent with x-rays).

2.5.2 Data Aggregation

For each physician aggregate identified, we calculated total visits provided, percent of visits involving each of the diagnostic and therapeutic services listed in Table 2-3 above, and mean length of visit. We then supplemented these basic data by summing the number of visits for each of the remaining categories on the NAMC surveys. For example, for disposition we have the number of visits with no planned follow-up, the number referred, and so on. Also categorized in this fashion were time since onset, patient's Reason For Visit (RFV), and the physician's principal diagnosis. We summed visits by RFV and diagnosis according to the categories outlined in Tables 2-4 and 2-5 above to reduce the number of potential variables to a manageable number.

Finally, all the basic physician descriptors are included along with an MD/DO designation, the year, and a sum total of the number of visits. The result is a physician-level analytic file of some 220 variables with between 1,500 - 2,000 observations for each of 8 years.

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*Information on the true number of physicians responding in each year was kindly furnished to us by NCHS.

TABLE 2-6

COMPARISON OF NAMCS PHYSICIAN SAMPLE AND AGGREGATE FILE SAMPLE: 1979

SPECIALTY	NAMCS PHYSICIANS (1)	AGGREGATE FILE PHYSICIANS (2)	RATIO (2) ÷ (1)
GP/FP	394	348	88%
Internal Medicine	247	214	87
Pediatrics	140	133	95
General Surgey	171	144	84
OB-GYN	156	144	92
Psychiatry	154	145	94
Other	521	452	87
TOTAL	1,783	1,580	89

different, we first made the two physician samples comparable. The final samples consisted of office-based, patient care MDs in the following specialties: cardiology, general and family practitioners, internists, OB-GYNs, and pediatricians. These specialties included 1976-1977 data on 2,193 physicians who reported on over 100,000 office visits from the USC survey, and approximately 28,500 office visits provided by 1,100 physicians surveyed by NAMC.

Three types of comparisons were made: (1) comparisons of visit content and diagnostic mix for visits as a whole; (2) comparisons of visit content for each of four "tracer" diagnoses: hypertension, diabetes, prenatal care, and well baby visits; and (3) comparisons of visit content and casemix, adjusting for seasonal differences.* All comparisons were done by specialty.

USC physicians consistently report visit lengths 2-3 minutes shorter than those of their NAMCS colleagues. This is true even within the tracer diagnoses and after adjusting for seasonal differences. Inter-specialty differences are similar between the two surveys, however, with cardiologists and internists spending considerably longer with their patients than physicians in the other three specialties.

As a rule, USC physicians are more likely to include lab tests and x-rays as part of their office visit. Although a seasonal adjustment narrows the gap, substantial differences remain. The apparent explanation for this discrepancy is that while NAMCS physicians simply responded lab tests (or x-rays) yes or no, USC physicians were given a choice of up to 11 different lab tests and up to 8 x-ray procedures. The sheer number of services listed may have reminded physicians to check one of them. Estimates of "single procedure" services, such as Pap test, ECG, and endoscopy, were virtually identical between the two surveys.

USC survey physicians reported an average of 1.34 different lab tests in every visit involving any lab tests. This implies that the NAMC surveys will underestimate lab test volume by 25 percent. Increases over time may be subject to even greater underestimates, if the number of tests per visit is rising faster than the number of visits involving any tests. Potential underestimates in x-ray volume are much smaller, however: -7 percent.

A major irreconciliable difference between the two surveys lies in the area of immunizations. NAMCS pediatricians report they vaccinate children in

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*Data collection in the USC survey took place during only one or two months of the year, with the actual months varying by specialty. Thus, seasonal variation could explain differences in estimates obtained from the two surveys.

almost one out of every four visits, while USC pediatricians do so less than 10 percent of the time. Casemix differences can not be a factor, for both USC pediatricians and USC general and family practitioners provide immunizations in far fewer of their well baby visits compared with their NAMCS colleagues. Adjusting for seasonal differences does help narrow the gap, but NAMCS immunization rates remain double those of USC pediatricians.

Office surgery rates are virtually identical between the two surveys, despite the fact that USC physicians had as many as 16 procedures from which to choose. Most individual procedures were performed in less than one-half of one percent of office visits.

Both USC and NAMC survey physicians report that medical counselling is a very important part of their office practices. Within our four tracers, however, NAMC physicians were considerably more likely to include some form of counselling, a finding which is consistent with their longer visits. Although the NAMCS counselling estimates have sometimes been criticized as being too high, USC estimates, particularly those of specialists, often seem too low. USC survey OB-GYNs, for example, provide counselling services in only one out of every ten prenatal visits, compared with one out of every three for NAMCS obstetricians.

A final source of underestimate in visit intensity from the NAMCS survey could result because less common, but more expensive, procedures were omitted from the questionnaire. The only services done with any frequency in the USC survey, such as thyroid function and TB skin tests, are fairly inexpensive and should not greatly add to visit intensity. Some services, on the other hand, while not frequently done, are quite expensive and thus may increase visit intensity <u>for this reason alone</u>. Cardiologists order complex diagnostic procedures, such as cardiac catheterization and angiograms, in almost two percent of all their office visits, for example. Since these complex procedures are not provided in the office but ordered for a future date, however, it may not be appropriate to consider them as part of the office visit content.

In sum, despite differences in reported visit length and levels of lab test utilization, office visit content is on the whole remarkably similar between the two surveys. Given the differences in survey design, we might have anticipated far greater variations. Equally important, <u>inter-specialty differences in visit length and ancillary use are consistent between the two surveys</u>.

2.7 Reliability and Validity of General and Limited Exam Questions

2.7.1 Objectives

Earlier in Section 2.4, we saw that two kinds of examination/histories were included in the NAMCS questionnaire: general exam/history and limited exam/history. General exams refer to a comprehensive work-up by the physician, while limited exams are directed at a specific body part, e.g., eye exam. Some analysts have expressed concern over the validity of these two categories and over their possible correlation with other services on the questionnaire. First, survey physicians may not be able to reliably discriminate between the two exam categories; they may consider all examinations they perform general (or limited) in nature. Alternatively, they may randomly choose one of those designations. In either case, estimated time trends in examinations would not be reliable. Second, physicians who report that they performed a general exam may fail to report other services on the questionnaire that are considered part of the general exam. Physicians might assume, for example, that blood pressure checks (or lab tests or Pap tests) would always be included in the general exam and hence need not be recorded separately. To the extent that this occurs, time trends in these other services will be underestimated. The extent of underestimate may also be systematically related to specialty; a Pap test might be an integral part of an OB-GYN's general exam but not of an internist's.

In this section, we assess the reliability of the two exam categories. Ideally, we would analyze the decision to perform a general or limited exam at the individual physician level. Unfortunately, the number of visits sampled per physician is too small for this--about 30 visits, of which only five on average would involve a general exam. Instead, we compare visits involving general exams with those involving limited exams to answer the following kinds of questions:

(1) Are physicians using the two exam designations appropriately? If so, then we would expect to observe significant differences between them; general exam visits should be longer, for example.

(2) Are physicians performing general exams less likely to report certain other diagnostic services? For example, are they more or less likely to report blood pressure checks compared with physicians doing limited exams?

These questions address the reliability and the validity, respectively, of the exam group designations. If all physicians chose to report the same kind of

exam for identical patients with identical problems, then the two exam designations would be reliable. To be valid, a visit including a general exam, for example, should have the characteristics associated with general exams and not limited exams.

2.7.2 Conceptual Approach

In attempting to test the reliability and validity of exam group designations, we must first understand how general and limited exams are defined in the NAMC survey and how a physician determines whether he has performed one or the other. Presumably the exam designation depends on the physician's interpretation of the exam definitions, his specialty, and the physician-stated reason for the visit.

The NAMC survey defines a general examination as a "history and/or physical examination of comprehensive nature including all or most body systems." A limited examination, by contrast, is defined as "an examination and/or history, which is limited to a specific body site, or which is concerned primarily with the patient's chief complaint." The physician has the choice of checking one of the general or limited exam categories, neither, or both (although the latter is theoretically incorrect). This provides us with four possible exam groups for each visit: general exam, limited exam, no exam or both exams.

As expected, less than one-half of one percent of all visits that we looked at reported both limited and general exams (see Table 2-7). The limited exam group accounted for 63 percent of the visits while the general and no exam groups accounted for 19 percent and 18 percent, respectively. We compared all three of these groups (general, limited, and no exam) and dropped the both-exam group from the study. In order to hold constant the possible confounding impact of time, we used 1981 data only in our analyses.

Testing for reliability between the exam groups requires that the general exam visits, although different from limited and no exam visits, be similar to each other. Since a general exam given by a pediatrician can be expected to differ from one given by an internist due to their different casemixes, we analyzed visits by primary care specialty. Primary specialists were chosen because they have the highest propensity to give general exams.

We would expect a physician to choose the type of exam and the type of ancillary services to provide based on his perceived reason for the visit. Healthy patients seeking preventive care probably receive general exams along

TABLE 2-7

DISTRIBUTION OF VISITS ACROSS EXAM GROUPS

Exam Group	Frequency (unweighted)	Percent (weighted)
General Exam	4,866	18.9%
Limited Exam	16,287	63.1
No Exam	4,612	17.9
Both Exams	37	0.1

with diagnostic services, such as lab tests and blood pressure checks. Therapeutic services, presumably, would not be administered to these healthy patients. On the other hand, patients with acute problems are likely to receive a limited exam since the problems would most likely be of a specific nature (e.g. cold) and would almost always require treatment. Thus, we would expect these patients to receive fewer diagnostic services than general exam patients, but more therapeutic ones. Finally, patients with routine, chronic problems probably receive a limited exam, or maybe none at all, depending on how familiar the physician is with the patient and his problem. We would expect that the majority of no exam visits were made up of patients with old problems seeking therapeutic services or diagnostic services of a routine nature.

2.7.3 Descriptive Results

The NAMC survey provides five physician-stated reasons for a visit: acute; chronic, flare-up; chronic, routine; post surgery/injury problems; and non-illness. Table 2-8 breaks down each exam group by these five visit reasons. The results of this table confirm our expectation that non-illness visits (consisting mostly of preventive care) make up a higher percentage of the general exam visits than any other exam group. For example, FPs administer preventive care in 41 percent of their general exam visits, compared with 10 and 20 percent of their limited and no exam visits, respectively.

Not surprisingly, chronic, routine visits make up a larger proportion of no exam visits than other exam visits. They also represent a fairly high proportion of limited exam visits. These results confirm our original expectation that physicians are familiar with the problems of these patients and probably don't need to do an exam.

Also as hypothesized, acute problem visits make up the largest proportion of limited exam visits. OB-GYNs are a definite anomaly, not only in having unusually few acute problems associated with limited exams, but also in administering such a large amount of preventive care with limited exams.

An examination of Table 2-9 explains these findings. Wide variations in reasons for visit exist among specialties, with almost two-thirds of all OB-GYN visits for preventive, non-illness care, as opposed to only 10 and 12 percent of internists' and FPs' visits, respectively. On the other hand, acute problems make up about half of GP and FP visits. These findings suggest that OB-GYNs should be giving more preventive care in all exam groups, with

TABLE 2-8

PERCENTAGE DISTRIBUTION OF REASONS FOR VISIT ACROSS EXAM GROUPS[a]

	Acute Problem	Chronic, Routine	Chronic, Flareup	Post Surgery/ Injury	Non-Illness
General Exam					
FPs	37.9%	12.6%	7.6%	0.7%	41.2%
GPs	53.7	19.5	5.2	1.5	20.1
Internists	30.2	30.2	11.4	1.0	27.2
OB-GYNs	21.9	6.2	4.5	1.4	66.1
Pediatricians	34.1	3.2	4.9	0.6	57.2
Limited Exam					
FPs	53.4	22.2	10.5	4.0	9.9
GPs	54.1	24.7	8.0	4.0	9.1
Internists	33.6	46.6	14.0	1.8	4.0
OB-GYNs	16.4	6.4	4.9	9.2	63.1
Pediatricians	68.1	5.9	5.6	1.4	18.9
No Exam					
FPs	39.1	31.1	6.7	3.5	19.6
GPs	36.3	39.0	7.6	5.5	11.6
Internists	25.8	49.6	10.3	1.1	13.1
OB-GYNs	18.8	12.3	6.1	4.8	58.0
Pediatricians	45.6	26.3	4.5	3.1	7.1

[a]Rows sum to 100 percent.

TABLE 2-9

PERCENTAGE DISTRIBUTION OF REASON FOR VISIT ACROSS SPECIALISTS

Specialists	Acute Problem	Chronic, Routine	Chronic, Flareup	PostSurgery/ Surgery	Non-Illness
FPs	49.2	22.3	9.5	3.5	15.5
GPs	50.5	26.7	7.5	3.9	11.5
Internists	31.7	44.2	13.0	1.6	9.6
OB-GYNs	17.6	7.3	5.0	7.3	62.7
Pediatricians	55.2	7.3	5.3	1.4	30.9

more diagnostic and fewer therapeutic services, while, GPs, for example, will be treating more acute problems in each exam group, resulting in more therapies performed along with general and limited exams.

Casemix across specialties clearly varies systematically, and we should expect different services to be associated with different exam visits across specialties. For example, Pap tests are probably an integral part of an OB-GYN's general exam and virtually non-existent in a pediatrician's general exam. The extent to which general exams differ by patient age, sex, as well as reason for visit, will affect the comparability, if not the reliability and validity of the general exam with respect to the mix of diagnostic and therapeutic services. The length of visit variable, by contrast, is not as subject to casemix differences, and should be the most reliable discriminator between the general vs. limited exam groups. (LOV may not be a particularly good discriminator between limited vs. no exam visits, as we shall see.)

Length of Visit

Since the length-of-visit variable is hypothesized to be the most reliable discriminator between the exam groups regardless of the reason for the visit, we will examine it first. Looking at Table 2-10, it is apparent that on average the physician does spend more time with the patient in the more comprehensive general exam visit.* Internists spend over twice as much time when they perform a general exam than when they do a limited exam (35.4 minutes per general exam as opposed to 16.9 minutes for a limited exam visit). Similarly, the other specialties all spend about one and a half times longer with general exam patients than they do with their limited exam patients. These results suggest that there is considerable face validity in the general vs. limited exam distinction. The consistency with which physicians in different specialties report longer visits for the general exam suggests that the exam designation is being reported reliably.

Although the primary focus of this analysis is to compare the general and limited exam visits, it is interesting to note that Table 2-10 does not conform to our expectations that a limited exam visit would be longer than a visit in which no exam was performed. The mean length of visit is strikingly

*Assuming that the differences between the exams arise from differences in visits with the physicians, all visits in which the patient did not see the physician were excluded. Zero lengths of visit were somewhat more likely to be concentrated in the no exam group. Eliminating these visits, however, made only a trivial impact on mean visit length for this group.

TABLE 2-10

MEAN LENGTH OF VISIT BY EXAM GROUP (in minutes)

	General Exam	Limited Exam	No Exam
FPs	19.6	12.6	12.4
GPs	17.4	12.6	12.8
Internists	35.4	16.9	16.8
OB-GYNs	19.1	12.5	12.6
Pediatricians	15.3	11.5	11.6

similar for both these groups. While this could cast some doubt on both the reliability and validity of the limited vs. no exam distinction, it could also be due to a substitution of physician time performing and/or interpreting other diagnostics or therapeutics in lieu of an exam. We will investigate this result further when we examine the ancillary service results.

Diagnostic Services

Comparing diagnostic services associated with the two groups, we find that, as expected, the general exam group is associated with a larger number of diagnostic services than the limited exam group (see Table 2-11). Although the differences between the two exam groups for clinical lab tests and blood pressure checks are not as marked as we might expect, there is still a systematic distinction between the groups across specialties. The consistent correlation between diagnostic services and general exams suggests that the exam designations are fairly reliable.

The lack of marked differences between the different exam visits, however, may suggest that physicians are underreporting lab tests and blood pressure checks when they do a general exam (e.g., blood pressure checks are provided by internists in only 71% of general exams versus 66% of their limited exam visits). Indeed, it is difficult to explain why GPs are checking blood pressures in only 57.5 percent of their general exam patients and clinical lab tests in only 28.4 percent, instead of 100 percent. It is possible that these two services may be considered by some physicians to be included in the definition of a general exam. Certainly, there is a much larger difference between the two exam groups for other services less commonly given with a general exam, such as x-rays, Pap tests, ECGs, and vision tests (as can be seen in Table 2-11).

Another explanation for the seemingly low frequency of certain diagnostic services for GP general exams might be that they have relatively few preventive care visits. As noted before, many of their general exam visits consist of acute problems. Perhaps blood pressure checks and lab tests are services commonly provided in a non-illness visit, but not in, say, a visit for flu. Also, blood pressure checks are not nearly as common in a pediatrician's general exam as in an internist's, reflecting patient age. Thus, when a GP treats children, he probably does not do a blood pressure check either, making his low percentage more acceptable. Simply because a

TABLE 2-11

USE OF DIAGNOSTIC SERVICES BY EXAM GROUP (percent of visits)

	General Exam	Limited Exam	No Exam
Clinical Lab Test			
FPs	50.4%	20.4%	41.3%
GPs	28.4	13.1	30.8
Internists	66.8	24.4	33.8
OB-GYNs	59.9	36.4	47.0
Pediatricians	30.9	20.2	45.7
Blood Pressure Check			
FPs	61.1	42.3	41.5
GPs	57.5	40.8	45.5
Internists	70.9	65.8	58.3
OB-GYNs	84.0	64.5	61.9
Pediatricians	17.2	4.5	9.3
X-Ray			
FPs	11.2	6.6	7.9
GPs	10.8	4.5	9.2
Internists	37.8	8.3	11.8
OB-GYNs	2.0	1.0	2.0
Pediatricians	1.9	1.8	4.7
Pap Test			
FPs	16.6	1.6	4.4
GPs	6.7	1.2	2.9
Internists	12.4	1.4	3.1
OB-GYNs	68.9	20.3	26.3
Pediatricians	0.1	0.1	0.4

TABLE 2-11 Cont.

USE OF DIAGNOSTIC SERVICES BY EXAM GROUP

	General Exam	Limited Exam	No Exam
ECG			
FPs	11.1	1.2	2.5
GPs	5.0	1.2	1.8
Internists	41.7	5.9	11.3
OB-GYNs	0.4	0.0	0.3
Pediatricians	0.5	0.2	0.3
Vision Test			
FPs	5.3	0.8	0.1
GPs	4.7	0.7	0.5
Internists	6.1	0.8	0.7
OB-GYNs	0.0	0.0	0.0
Pediatricians	9.6	1.0	2.9
Endoscopy			
FPs	0.6	0.2	1.0
GPs	0.7	0.2	0.2
Internists	3.9	0.8	3.7
OB-GYNs	0.5	0.3	5.9
Pediatricians	0.1	0.0	0.1

general exam differs by patient condition is no reason to consider it an invalid term across specialties. It does suggest caution, however, in explaining general exam content among physicians.

Earlier we saw that no exam visits were as long as those involving limited exams, suggesting that physicians must be doing more of something else. Table 2-11 shows that physicians generally are providing many other services during these no exam visits: more Pap tests, lab tests, x-rays, and ECGs. The remaining tests vary by specialty. Interpreting the test results and suggesting a course of treatment evidently takes roughly the same time as performing a limited exam.

Therapeutic Services

Comparing the first two exam groups across therapeutic services, one finds that, generally, the limited exam is associated with a larger number of services than the general exam group (see Table 2-12). This is the case across most specialties for physiotherapy, office surgery, and drug prescriptions, where there are probably a lot of returning patients with a previously diagnosed problem. This confirms our expectation that the treatment-oriented services would be more associated with a limited exam and reinforces our conclusion that physicians are using the two exam categories correctly.

Exceptions to this general trend can be explained by differences in specialty or by the ambiguity in the definition of the service variable. For example, OB-GYNs appear to prescribe "therapeutic" drugs more often during a general exam than a limited exam (see Table 2-12). But since the drug variable includes both prescription and over-the-counter drugs, many of the "drugs" in OB-GYN visits are actually non-illness related, e.g., prenatal vitamin supplements and contraceptives. The counselling variable is also composed of many heterogeneous categories, which might explain the lack of a clear trend for this variable.

As far as therapeutic services are concerned, we might expect the no exam group, like the limited exam group, to have a higher proportion of such services relative to general exams. Once again, we assume that for the therapeutic services, the patient problem has already been ascertained, so that an examination might not be necessary. We see in Table 2-12 that the no exam and limited exam groups are, in fact, very similar, just as they were on length of visit.

TABLE 2-12

USE OF THERAPEUTIC SERVICES BY EXAM GROUP (percent of visits)

	General Exam	Limited Exam	No Exam
Drugs			
FPs	61.6%	73.9%	65.2%
GPs	68.9	73.4	72.0
Internists	63.5	81.8	70.5
OB-GYNs	48.6	36.8	41.3
Pediatricians	67.1	75.0	73.0
Counselling (all types)			
FPs	39.8	37.5	36.3
GPs	36.5	25.5	31.0
Internists	51.3	45.7	37.1
OB-GYNs	43.1	30.3	37.7
Pediatricians	36.5	30.7	27.9
Physiotherapy			
FPs	2.2	4.8	3.5
GPs	5.0	5.4	7.4
Internists	4.0	3.8	2.9
OB-GYNs	0.4	0.4	1.0
Pediatricians	0.8	1.6	0.7
Office Surgery			
FPs	2.2	6.0	12.2
GPs	4.1	5.2	9.5
Internists	0.8	1.5	2.9
OB-GYNs	4.1	4.3	9.0
Pediatricians	7.4	4.9	8.3

Visit Status

There are also systematic differences across the three groups with respect to visit status. Presumably a physician would almost always give a new patient some kind of an examination, a general exam most likely since he had never seen this patient before. A new problem of a returning patient should warrant at least a limited exam, while many returning patients with existing problems might not need an exam at all (especially if the problem were a chronic, routine one).

Comparing the three patient status categories, first, as a proportion of each exam group (see Table 2-13), we find that our expectations are borne out. The general exam group contains a larger percentage of new patients across all specialties than any other exam group. The limited exam group has the largest percentage of returning patients with new problems, and the no exam group has the most returning patients with old problems. For example, returning patients with old problems make up 76 percent of internists' no exam visits.

Looked at another way, physicians are 2-5 times more likely to do a general exam on a new patient than on an old patient with a known problem. This, too, is what we would expect. It is interesting, though, that general exams are still done on less than half of all new patients. This may be because the patient has an acute problem requiring only a limited exam and more immediate, local, attention. Referrals may also reduce the need for a general exam.

2.7.3 Multivariate Analysis

The descriptive results reveal differences among the general, limited and no exam group visits with respect to other services and the length of the visit. In order to control for confounding factors in the relationships between these services and the length of the visit, and to statistically distinguish between the exam groups, we turn to multivariate analysis. Such an analysis will allow us to examine the relative importance of the service and length of visit variables in distinguishing between general, limited and no exam visits. This examination will reveal, for example, how significant the length of visit variable is in discriminating between a general and limited exam. It can also tell us if a service is more associated with a general exam in that specialty to which it is specific (e.g., we would expect to find Pap tests more highly correlated with a general exam in the OB-GYN specialty than in others).

TABLE 2-13

PERCENTAGE DISTRIBUTION OF PATIENT STATUS ACROSS EXAM GROUPS[a]

	Old Patient/ Old Problem	Old Patient/ New Problem	New Patient
General Exam			
FPs	44.8%	36.7%	18.4%
GPs	47.4	31.2	21.5
Internists	49.8	19.1	31.1
OB-GYNs	45.9	16.9	37.2
Pediatricians	57.7	29.4	12.9
Limited Exam			
FPs	52.4	37.6	10.0
GPs	56.7	34.9	8.5
Internists	70.9	21.4	7.7
OB-GYNs	77.3	15.4	7.2
Pediatricians	48.3	44.2	7.5
No Exam			
FPs	66.1	25.8	8.2
GPs	70.9	20.2	8.9
Internists	75.7	16.8	7.5
OB-GYNs	74.1	17.0	8.9
Pediatricians	61.1	30.5	8.4

[a]Rows sum to 100 percent.

Ideally, to make such analyses, we would use discriminant analysis. This technique weights and linearly combines the discriminating variables (other services and visit length) such that the exam group visits are forced to be as statistically distinct as possible. The weighting coefficients obtained by such a procedure are interpreted in a manner similar to those in multiple regression analysis, and represent the relative contributions of the variables to the discriminant function. Unfortunately, this technique cannot be used with any of our statistical packages (SAS or BMDP), because of the complex weighting scheme of the NAMC survey. Since the weights are too important in keeping the sample representative of national visit characteristics, we decided to use multiple regression analysis instead. Using the linear probability model, we can approximate the superior discriminant analysis approach by creating two regressions, both of which contain dependent dummy variables. We ran each of these regressions for all five primary care specialties, yielding ten regressions in all. In the first set of regressions, general exam visits took on the value of one and limited exam visits took on the value of zero, while in the second set, the limited and no exam groups took on the values of one and zero, respectively. Positive coefficients in the first set imply that services are more likely to be associated with a general exam visit while negative coefficients relate to a limited exam visit. In the second set, the positive values are correlated with limited, and the negative values with no exam, visits.

Although this technique is similar to discriminant analysis, there is a problem with using this approach. First of all, the interpretation of the coefficients implies a causality between the explanatory and dependent variables that is not suited to our analysis. To tailor the results to our purpose of ranking the independent variables in terms of their discriminating power, we used beta weights. This simplifies the regression results and allows us to make a direct comparison of the independent variables (which are measured in different units). The signs of the standardized coefficients retain their former meaning, and the magnitudes of the beta weights describe the relative degree of correlation between the visit characteristics and the exam groups.

The results of the first set of regressions for the general/limited dependent variable corroborate the descriptive results (see Table 2-14). The length of visit beta weight was large and significant across all specialties (e.g., 0.33 for internists), which implies that visit length is the foremost discriminator between the general and limited exam visits. The results also

TABLE 2-14

REGRESSION RESULTS FOR GENERAL AND LIMITED EXAMS

Variable	FPs	GPs	Internists	OB-GYNs	Pediatricians
Length of Visit	0.19***	0.19***	0.33***	0.17***	0.23***
Pap Test	0.19***	0.09***	0.09***	0.34***	-0.03*
Lab Test	0.13***	0.09***	0.16***	0.09***	0.02
X-Ray	-0.01	0.05***	0.09***	-0.01	-0.02
Blood Pressure	0.05***	0.06***	-0.04***	0.06***	0.09***
ECG	0.14***	0.03**	0.17***	0.05***	0.02
Vision Test	0.06***	0.09***	0.07***	-0.01	0.12***
Endoscopy	-0.01	0.02	-0.04***	0.00	0.01
Drugs	-0.08***	-0.01	-0.08***	0.03**	0.07***
Physiotherapy	-0.02	0.00	0.02	-0.02	-0.03
Office Surgery	-0.07***	-0.03***	-0.02	-0.02	0.01
Counselling	-0.04**	0.03***	0.02	0.06***	0.03**
R^2(c)	0.20	0.11	0.37	0.23	0.12
F(df)	(13,3397) =72.31***	(13,5547) =58.91***	(13,4339) =213.44***	(13,3585) =88.07***	(13,4016) =44.67***

***Significant at one percent level.
**Significant at five percent level.
*Significant at ten percent level.

confirm our expectation that services will be most highly correlated with general or limited exams in specialties specific to their use. Pap tests, although significantly associated with the general exam for most specialties, were especially correlated with the general exam for OB-GYNs. This trend is found for FPs and internists administering ECGs in the general exam visits, and for GPs and pediatricians providing vision tests in general exam visits. If physicians are underreporting these services provided within a general exam, it is not serious enough to invalidate the general/limited exam distinction. The exception to this trend is blood pressure check, which is associated with the limited instead of the general exam for internists. Either this service was underreported on general exams or, more likely, the caseload of internists is prone to heart problems, in particular, so that an unusually large number of limited exam visits also include blood pressure checks.

The therapeutic services were less significant in distinguishing between exam types than the diagnostic services, but where they were significant, they confirmed the descriptive results. For example, drugs were positively correlated with the limited exam for all specialties but GPs and OB-GYNs.

Looking at the discriminating variables for the limited/no exam regressions, we find that while the length of visit is not the most important variable in distinguishing between the groups, as it was in the general/limited exam regressions, it is significantly correlated with the limited exam group for all specialties (see Table 2-15). This result suggests that holding services constant, there <u>is</u> a distinction between these exam groups that was not apparent in the descriptive results. The positive length of visit coefficient, combined with the negative coefficients for the services, suggests that much of the visit time in the no exam group is devoted to physician interpretation of clinical lab and other tests, as well as office surgery. Diagnostic variables have a higher probability of being included in the no exam than in the limited exam group, except for internists and OB-GYNs giving blood pressure checks and FPs giving vision tests.

The significant therapeutic services variables clearly vary between the limited exam and no exam by specialty. Office surgery is positively associated with no exam visits for almost all specialties. This would further contribute to the longer-than-expected visit lengths for this type of visit. Clear, strong trends are not apparent for the other services, in part because of the ambiguous nature of the variables, as described earlier.

TABLE 2-15

REGRESSION RESULTS FOR LIMITED AND NO EXAMS

Variable	FPs	GPs	Internists	OB-GYNs	Pediatricians
Length of Visit	0.05***	0.04***	0.05***	0.03**	0.05***
Pap Test	-0.07***	-0.05***	-0.05***	-0.06***	-0.03
Lab Test	-0.20***	-0.20***	-0.08***	-0.10***	-0.22***
X-Ray	-0.02	-0.08***	-0.01	-0.03*	-0.08***
Blood Pressure	0.01	-0.03**	0.06***	0.05***	-0.02
ECG	-0.05***	-0.01	-0.09***	-0.04**	-0.01
Vision Test	0.04**	0.00	0.02	0.01	-0.03*
Endoscopy	-0.05***	-0.01	-0.09***	-0.18***	-0.03*
Drugs	0.05***	-0.00	0.09***	-0.03	0.00
Physiotherapy	0.01	-0.06***	0.02	-0.03*	0.02
Office Surgery	-0.10***	-0.10***	-0.03*	-0.07***	-0.02
Counselling	0.00	-0.04***	0.07***	-0.05***	0.03*
R^2(c)	0.06	0.06	0.04	0.06	0.06
F(df)	(13,3485) =19.38***	(13,5752) 32.21***	(13,4267) 17.17***	(13,3575) 18.37***	(13,3078) 16.26***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

2.7.4 Summary

The preceding analysis generally confirms a reliable reporting of general and limited exams. The significant differences in exam groups for the length of visit and service results suggest that physicians are reliably distinguishing between exams. It is possible that some underreporting of services associated with a general exam occurs. It is more likely, however, that the reason for the visit largely defines the content of a general exam. A general exam given for a healthy patient may include different services than one given to a sick patient, just as services rendered in a child's general exam will differ from those administered to adult women.

It is also important to note that many services associated with a general exam are not listed separately in the NAMC survey. In particular, data on many diagnostic services provided by the physician (e.g., ear, nose, and throat checks; heart and lung checks; reflex checks, etc.) are not included in the survey instrument. Perhaps for some cases, these types of services are the distinguishing features of a general exam. In spite of this nonreporting, the regression results for the listed ancillary services generally confirm the validity of the exam designations.

3.0 CHANGES IN OFFICE CONTENT OVER TIME: DESCRIPTIVE RESULTS

This chapter provides descriptive results for the first longitudinal analysis of NAMCS data. The chapter is in three parts. First, national trends in office length of visit and diagnostic and therapeutic services are presented. This is followed by a specialty breakdown of the same data, then a regional decomposition.

3.1 National Trends in Office Visit Content

There has been a general feeling that real increases in physician expenditures, net of utilization increases, may reflect an improvement in the quality of care. Physicians are charging more per visit, the argument goes, because the visit is worth more: physicians are spending more time with each patient and providing more services per visit. To date, however, there has been no time-series documentation of any such shifts in office visit content. This study provides such evidence for the first time.

3.1.1 Diagnostic Services

Table 3-1 presents national means by year for each of our dimensions of office visit content: diagnostic services, therapeutic services, and visit length. The numbers for the various services refer to the percent of office visits for which a given service was ordered or provided. Although there is considerable fluctuation from year to year, many of the dimensions do show increases over our time series. Physicians conducted a limited exam and history for almost two-thirds (64.9%) of all office patients in 1981, an increase of 27 percent from 1975. At the same time, however, general exams and histories show little evidence of diminishing in frequency, as one might expect if physicians were substituting limited for general exams over time. Instead, an exam of some sort appears to be a more and more common component of every office visit. Some kind of exam and history was involved with 80 percent of all visits in 1981, compared with 67 percent in 1975. Why the increase in exams? There are a number of possible explanations: an increase in specialist supply (assuming specialists are more likely to conduct exams), an increase in the number of new patient or new problem visits (which presumably more often require an exam), a more serious casemix, etc. We explore all of these possibilities in detail in subsequent chapters.

TABLE 3-1

CHANGES IN OFFICE VISIT CONTENT OVER TIME, NAMCS 1974-1981

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services (% of Visits)								
Limited Exam/History	--	51.3	51.9	56.3	61.8	63.0	63.8	64.9
General Exam/History	--	15.7	16.9	22.4	21.3	16.8	15.8	15.1
Clinical Lab Test	19.1	22.9	22.7	21.4	20.8	23.2	21.8	22.1
X-Rays	7.1	7.4	7.7	7.8	8.2	8.2	7.3	7.6
Blood Pressure Check	--	33.2	33.2	34.0	33.3	36.0	33.9	34.7
Pap Test	--	--	--	5.4	4.9	4.9	4.4	4.3
ECG	--	3.4	3.3	3.0	3.4	2.7	2.8	3.2
Endoscopy	--	1.2	1.2	1.2	1.0	1.3	0.8	1.0
Vision Test	--	4.7	5.2	4.0	4.8	6.0	5.7	5.8
Therapeutic Services (% of Visits)								
Immunization/Desens.	17.1	4.5	5.3	6.6	7.8	5.2	63.1	60.6
Injections		13.8	12.5	--	--	9.6		
Drugs-Prescription	44.6	44.3	42.8	53.6	51.8	46.8		
Drugs-Non-Prescription	5.0	--	--			4.5		
Office Surgery	--	6.7	7.1	7.9	7.7	7.4	7.5	7.3
Physiotherapy	--	2.2	3.0	3.3	3.6	3.1	5.1	4.6
Medical Counselling	--	12.3	13.6	20.6	19.4	22.2	23.2	22.9
Diet Counselling	--	--	--	6.9	7.4	6.0	8.5	7.6
Psychotherapy/ Therapeutic Listening	4.4	4.3	4.1	5.4	5.0	4.4	5.0	4.8
Family Planning	--	--	--	1.5	1.4	1.4	2.2	1.9
Length of Visit (minutes)	14.0	14.5	14.6	14.8	14.4	14.9	15.3	15.4

Two ancillary services of particular concern to policymakers are laboratory tests and x-rays, as they are both popularly believed to be a major source of inflation in medical care expenditures, particularly in the hospital. Table 3-1 shows that both are increasing in frequency in the physician's office as well. The percent of office visits involving laboratory tests increased 15.7 percent from 1974 to 1981 (albeit not consistently), and x-rays 7.0 percent. While the percent increases seem fairly large, the absolute changes are relatively small, one half of one percentage point in the case of x-rays, for example. However, with over 585 million office visits nationally, even an increase of only half a percentage point would translate into a minimum of 2.9 million additional x-rays, assuming the trend were statistically significant. (We will test this directly in Chapter 5.0).

It also appears that physicians are checking the blood pressure of a growing number of patients: an increase of 4.5 percent from 1975 to 1981. This is hardly surprising, given the growing number of elderly in the population. What is surprising is that electrocardiograms (ECGs) are not being utilized any more frequently than they were in 1975, even though the two specialties most likely to order ECGs (internists and cardiologists) have increased their market share markedly over our time-series. (See Table 3-4 below.)

Although Pap tests were only included in the last five years of the survey, they appear to be declining over time. Whereas 5.4 percent of physician visits involved Pap smears in 1977, only 4.3 percent did in 1981, a reduction of more than 25 percent. Vision tests, by contrast, are being performed more often during physicians' office visits, up 23 percent from 1975, although absolute levels are still quite low (5.8% in 1981). Both an aging population and an increased supply of ophthalmologists may contribute to this trend. As for the remaining diagnostic service, endoscopies, the absolute frequencies are simply too low to establish a reliable time trend. Since they are so rarely ordered, disaggregation by specialty may help identify time trends.

3.1.2 Therapeutic Services

Caution must be exercised in interpreting trends for the first four therapeutic services on Table 3-1. Beginning in 1980, the NAMC surveys began combining all immunizations, injections, prescription and non-prescription drugs into one service category, "medication therapy". We are not able to compare this figure with the sum of the four separate medication-related

categories for the previous years, however, because of differences in survey wording. In the earlier survey years, if a physician provided an immunization and a non-prescription drug, for instance, then each of these services was checked off separately. If the same services were provided in 1980 or 1981, though, the physician was instructed to actually specify what drug was ordered, regardless of how it was administered. Although this level of detail is desirable for some analytic purposes, our primary interest lay in whether drug therapy was provided or not; thus, we recoded this variable into a 0-1 dummy to indicate presence (=1) or absence of medication (=0) during the visit. As a result of this simplification, a simple sum of the different types of drug visits available in early years would tend to overestimate medication therapy for 1974-1979 relative to the 1980-81 figures.

This limitation aside, there does appear to be a modest increase in immunizations and desensitization from 4.5 percent in 1975 to 5.2 percent in 1979, the last year this service was included explicitly in the survey. The use of injections, on the other hand, actually appears to fall by a third over the same time series. Why this should occur is not certain, but the development of oral medications (and their subsequent substitution for intravenous administration) is one possible explanation.

Office surgery shows a fairly stable positive trend, increasing 9 percent from 1975 to 1981 (from 6.7% of visits to 7.3%). This increase may reflect both the performance of operations on patients not previously treated and the substitution of office for inpatient surgery.

Physicians were more than twice as likely to order physiotherapy in 1981 as they were in 1975, although absolute levels remain quite low (about 4.6 percent of all visits). This trend is difficult to interpret, however, as the survey definition of physiotherapy includes not only such relatively complex procedures as physical rehabilitation for stroke or trauma victims, but also such procedures as ultraviolet light treatment for teenagers with acne. It also includes "manipulative therapy," the unique treatment modality provided by DOs.

From 1975 to 1981, physicians almost double their share of office visits involving medical counselling. Surprisingly, when diet counselling was made a separate service in 1977, medical counselling actually <u>increases</u> in intensity rather than falling off as expected. (Prior to this, medical counselling included diet counselling.) In 1981, physicians provided medical advice regarding diet, exercise, or health habits to more than one of every four office patients, compared with one out of eight in 1975. Why the tremendous upsurge? Probably physicians have become increasingly sensitized to the

importance of preventive health behavior and their role in teaching patients new health habits. Since medical counselling is a time-consuming activity for physicians, we would expect lengths of visit to increase considerably as well, a question we examine directly below. (Alternatively, physicians may simply have become aware of the fact that they should be providing such counselling, but with no real change in behavior, e.g., no longer visits.)

About 4-5 percent of all office visits involve psychotherapy or therapeutic listening. Since psychiatrists account for less than three percent of all visits (see Table 3-4 below), other types of specialists must be providing this service as well. Although there is a small net increase in psychotherapy from 1975 to 1981, no stable time trend is apparent. Disaggregation by specialty may shed more light on this service, as we shall see in section 3.2.

As for the final therapeutic service, only five years of data on family planning services were available. Although there does appear to be a slight increase over time, absolute levels are quite low and it is difficult to identify any reliable trend from this table.

3.1.3 Length of Office Visit (LOV)

The final dimension of visit content in Table 3-1 is the length of the visit, defined as the actual duration (in minutes) of face-to-face contact between patient and physician. Time spent with nurses or other personnel is specifically excluded. In a few cases (about 3% of all visits), the length of visit is zero; these are instances where the patient saw only an aide, perhaps to renew a prescription or check a TB skin test. As seen on Table 3-1, lengths of visit with the physician average 14-15 minutes with an increase of only 10 percent from 1974 to 1981, or about 10 seconds per year. This relatively small rate of increase is particularly surprising, given the considerable increase in time-consuming (and often non-delegatable) services, such as examinations, blood pressure checks, and medical counselling. Moreover, given the increase in the supply of specialists, who tend to have much longer visits on average (see Section 3.2), we also would have expected more rapid increases in office visit lengths.

There are, however, a number of offsetting effects. As specialists increasingly substitute for GPs in the delivery of primary care, for example, their casemix should become less severe on average, thereby diminishing intensity increases over time. The substitution of aide for physician time will also lower the rate of increase in time spent with the physician, a shift

in practice style believed to be on the rise. In the next section we will examine specialty-specific trends in visit length, and in Chapter 5.0, we will use regression analysis to hold constant not only specialty, but casemix, practice type, and other characteristics as well.

Table 3-2 and the accompanying figure give the size distribution of visit lengths for the latest year, 1981. The modal LOV is 12-14 minutes, somewhat below the mean of 15.4. The distribution shows a pronounced right skew with over 10 percent of all visits exceeding 23 contact minutes with the physician. Fewer than two out of 100 visits involve less than 4 minutes of the physician's time, at the other extreme.

3.1.4 National Trends in the Supply of Physicians and Market Shares

In evaluating time trends in service delivery, it is important to recognize the changing characteristics of the physician pool, particularly specialty mix. The first two columns in Table 3-3 display physician specialties as a percent of all patient care, office-based physicians in 1974 and in 1980 (the latest year available). The third column gives the percentage point change in the relative supply of physicians (col. 2 minus col. 1). Finally, the last column shows the absolute change in the supply of physicians in each specialty, e.g., the supply of GPs has risen by about 29 percent over the 1974-80 period. Unlike all other tables in this report, Table 3-3 is based on data from the American Medical Association (AMA).

As expected, general and family practitioners, as a percent of all physicians, have fallen from 25.6 percent in 1974 to 19.8 percent in 1980, a drop of almost 25 percent. The absolute supply of GPs and FPs rose slightly over the same period, however, by about 2.1 percent.* General surgeons and OB-GYNs have also declined in relative terms (albeit very slightly), even though their real numbers grew considerably over the 7 years (by 16% and 29%, respectively).

With the exception of allergists, all other subspecialty groups have increased dramatically, both relatively and absolutely. Of particular interest to those concerned over the decline of general practitioners is the growth in the relative supply of other primary care physicians: internists, OB-GYNs, and pediatricians. These three specialties increased as

*Unfortunately, AMA data were only available on MDs; since DOs are disproportionately general practitioners and DOs have been growing over time, the GP market share may be somewhat underestimated.

TABLE 3-2

FREQUENCY DISTRIBUTION OF OFFICE LENGTH OF VISIT: ALL PHYSICIANS, 1981

Length of Visit (in minutes)	Percent of Office Visits	Cumulative Percent of Office Visits
0-2	.40	.40
3-4	.86	1.26
5-6	4.10	5.36
7-8	9.12	14.55
9-10	10.63	25.18
11-12	14.69	39.87
13-14	15.98	55.85
15-16	11.78	67.63
17-18	8.94	76.57
19-20	6.74	83.31
21-22	3.64	86.95
23-24	3.70	90.65
25-26	2.18	92.82
27-28	1.20	94.02
29-30	.95	94.97
31-36	1.41	96.38
37-42	1.59	97.97
43-48	1.08	99.05
49-54	.77	99.82
55+	.18	100.00

FIGURE 3-1

FREQUENCY DISTRIBUTION OF OFFICE

LENGTH OF VISIT: ALL PHYSICIANS, 1981

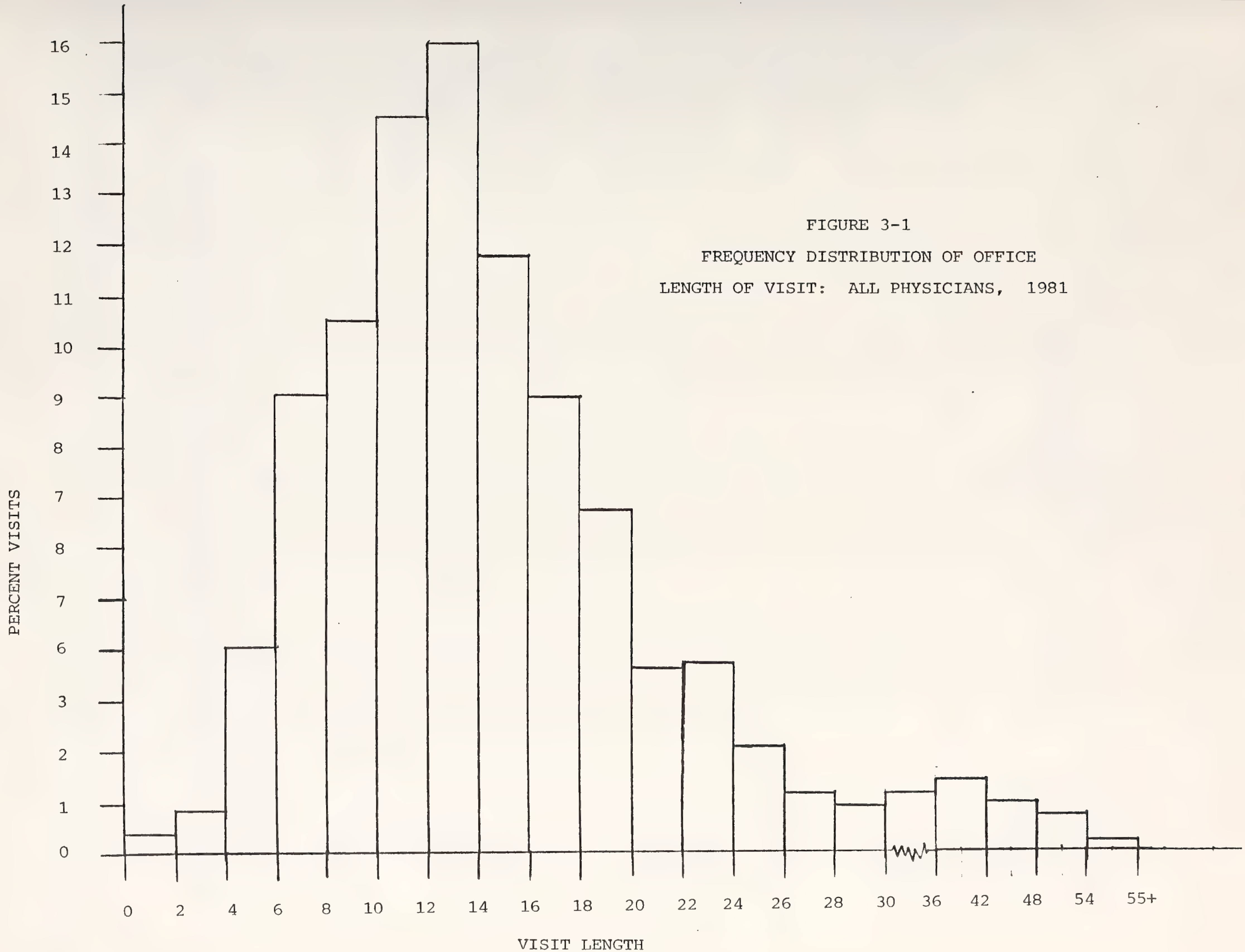

TABLE 3-3

CHANGES IN THE SUPPLY OF PHYSICIANS OVER TIME[a]

	Percentage Distribution of Physicians[b]		Difference (2-1)	Total Supply (Percent Change 1974-1980)
	1974	1980		
	(1)	(2)	(3)	(4)
GPs/FPs	25.6%	19.8%	-5.8	2.1%
General Surgeons	10.6	9.3	-1.3	16.0
Internists	14.2	16.8	2.6	55.9
OB-GYNs	8.3	8.1	-0.2	29.0
Pediatricians	6.8	7.5	0.7	46.9
Allergists	0.8	0.6	-0.2	-3.8
Cardiologists	2.4	2.8	0.4	52.7
Dermatologists	1.8	1.8	0.0	33.0
Other medical specialists[c]	2.2	3.3	1.1	98.3
Ophthalmologists	4.6	4.4	-0.2	25.4
Orthopedic Surgeons	4.2	4.5	0.3	38.2
Otolaryngologists	2.3	2.2	-0.1	26.9
Urologists	2.6	2.6	0.0	29.4
Other surgical specialists	2.9	3.0	0.1	33.1
Psychiatrists	7.2	7.4	0.2	37.0
Other	3.5	5.9	2.4	126.5

[a]Source: American Medical Association, Physician Distribution in the U.S., 1974, 1980. This table presents data on MDs only.

[b]Columns sum to 100%.

[c]Includes neurologists.

a proportion of all physicians about ten percent over the time period, going from 29.3 percent to 32.4 percent, partially offsetting the loss of GPs. Medical and surgical subspecialists also show tremendous increases, especially in absolute terms, though this is largely a function of their small numbers to start with. The "other" category refers to patient care specialties not elsewhere classified and is similar to the "other" category used in the NAMC surveys: occupational and physical medicine, general preventive medicine, etc.

Because of differences in work effort and the extent of hospital practice, the market share distributions in Table 3-3 will not completely reflect the changes in office visit shares over time. Table 3-4 presents the distribution of office visits by specialty from 1974-1981, using NAMCS data. (We have separated FPs from GPs in Table 3-4, a disaggregation which is not possible with AMA data.) The fall in GP/FP visits evidenced here is far more dramatic: 23 percent over the eight years, or approximately 5.3 million fewer visits in 1981 than 1974. The visit share of GPs alone decreased 47 percent over the 1974-81 period, falling from 38.9 percent in 1974 to 20.6 percent in 1981. These decreases reflect not only an absolute decline in the supply of GPs due to death or retirement, but a reduction in work effort due to failing health or advancing age.

A major shift towards family practice has occurred, minimizing the combined GP/FP decline. FPs accounted for 12.4 percent of office visits in 1981 compared with merely 3.7 percent in 1974--more than a three-fold increase. The nature of these FPs has also changed over the time-series. In the early years, most of the FP visits were probably provided by general practitioners who had passed the family practice boards and were thereby "grand-fathered" into the specialty. Later on, many more of these visits may be provided by "pure" FPs, physicians who actually completed a residency in family practice. We might expect these residency-trained FPs to practice more like other specialists (order more tests, for example) than like GPs or FPs without advanced training.

Like GPs, general surgeons (who tend to be older than other specialists) show a decline in their share of office visits that exceeds their decline in importance among physicians. The primary care slack is picked up largely by internists, OB-GYNs, and pediatricians, who together increased their share of visits by about 22 percent. The visit share of medical specialists rose from 6.4 percent in 1974 to 8.2 percent in 1981, and surgical specialists from 13.9 to 16.6 percent, much slower than their absolute increases shown in the last column of Table 3-3.

TABLE 3-4

CHANGES IN OFFICE VISIT SHARE BY SPECIALTY OVER TIME (percentage distribution)[a]

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	3.7	5.4	5.7	10.3	8.9	9.2	11.4	12.4
GPs	38.9	35.8	32.6	29.1	27.3	25.6	22.2	20.6
MDs	32.5	28.4	27.6	24.3	23.1	20.6	16.8	15.6
DOs	6.4	7.4	5.0	4.8	4.2	5.0	5.4	5.0
General Surgeons	6.2	7.7	6.1	6.1	5.6	6.0	4.8	5.6
Internists	11.1	10.8	11.6	11.4	11.7	12.0	11.9	12.7
OB-GYNs	7.9	8.4	8.3	8.6	9.4	9.1	9.5	9.2
Pediatricians	7.9	8.2	10.6	9.6	10.3	10.4	11.1	10.8
Allergists	1.4	0.9	1.2	1.6	1.3	1.4	0.8	0.9
Cardiologists	0.7	1.4	1.1	1.1	1.2	1.3	1.1	1.5
Dermatologists	2.9	2.5	3.7	2.9	3.5	3.1	4.8	4.0
Other medical specialists*	1.4	1.2	1.0	1.2	1.6	1.5	1.3	1.8
Ophthalmologists	4.5	4.2	5.0	4.7	5.5	5.5	5.3	5.4
Orthopedic Surgeons	4.0	3.4	4.7	3.5	3.9	5.6	4.6	5.0
Otolaryngologists	2.6	2.8	1.8	2.8	2.8	1.8	2.1	2.4
Urologists	1.4	1.9	1.7	2.0	1.8	1.7	1.5	1.8
Other surgical specialists	1.4	1.2	1.2	1.5	1.7	1.4	1.9	2.0
Psychiatrists	2.6	2.6	2.4	2.8	2.6	3.1	2.7	2.7
Other	1.6	1.6	1.3	0.9	0.9	1.4	3.2	1.4

[a]Columns sum to 100%.

*Includes neurologists.

The rather dramatic changes in physician supplies as well as in mix occurring over the last decade suggests a separate analysis of visit content by specialty. This is the purpose of the next section.

3.2 Specialty Trends in Office Visit Content

We know from Table 3-4 that the office visit shares of the various specialties have shifted over time. Most important, the share of visits provided by GPs has fallen, and FPs, internists, and pediatricians in particular appear to have taken up the slack. Yet different specialties have very different styles of practice; not only do specialists differ from GPs, but they also differ from each other. It may be that much of the variation in visit length and service intensity can be explained by specialty alone. If so, then trends of specialty mix over time would provide a good measure of shift in visit content. In this section, we examine time trends by specialty for each of our dimensions of visit content. In a final subsection, we present similar time trends for MDs and DOs.

3.2.1 Lengths of Visit by Specialty

Table 3-5 presents mean visit lengths by year for each of the specialties in our sample. Although lengths of visit vary somewhat from year to year, they do show a slight increase over time.* Visits to all primary care practitioners except pediatricians have increased 1-2 minutes on average over the 1974-81 period. The largest change, in both absolute and relative terms, is for family practitioners, whose visit lengths have increased by 20 percent in just eight years. Because of this rapid growth rate, FPs' visits have actually surpassed GPs' visits in length, even though GPs had longer visits at the beginning of the period. This trend confirms our earlier hypothesis that the FP sample includes more and more residency-trained FPs over time, a group that may have a much more intensive practice-style than other FPs.

Perhaps even more interesting than the intertemporal changes are the specialty differences in office visit length. Psychiatrists naturally have the longest visits: 42 minutes on average. Among the primary care specialties, internists have visits well above average, 19.5 minutes compared with about 13 minutes for general and family practitioners, and OB-GYNs. Pediatri-

*Recall that for certain physician subspecialties, like allergy, sample sizes are too small to provide reliable time trends. (See Chapter 2 and Appendix A.)

TABLE 3-5

CHANGES IN LENGTH OF OFFICE VISIT BY SPECIALTY OVER TIME (MINUTES)

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	11.0	11.1	11.2	10.3	12.2	12.8	12.5	13.3
GPs	11.9	12.6	12.6	13.3	12.5	13.1	13.5	12.9
General Surgeons	12.4	12.4	14.2	12.8	13.2	14.5	13.7	13.9
Internists	18.0	17.8	18.8	18.1	18.8	17.3	19.8	19.5
OB-GYNs	12.4	12.6	13.0	14.1	12.6	13.1	13.6	13.4
Pediatricians	12.4	11.4	11.3	12.1	11.0	11.1	11.9	12.3
Allergists	12.2	12.7	19.5	12.0	6.3	9.4	12.7	10.8
Cardiologists	22.5	21.1	22.9	20.3	19.4	20.0	22.8	20.3
Dermatologists	12.0	11.6	10.9	13.3	10.3	11.6	11.7	10.6
Other medical specialists[a]	20.4	25.0	25.1	23.2	19.9	25.8	24.4	24.9
Ophthalmologists	17.8	20.1	16.3	17.5	17.7	17.5	17.5	18.9
Orthopedic Surgeons	12.7	14.2	15.2	14.9	14.2	14.0	13.4	13.9
Otolaryngologists	12.3	13.5	13.3	13.0	13.5	14.2	14.0	12.6
Urologists	14.9	14.9	17.1	13.0	15.9	16.3	16.3	17.1
Other surgical specialists	14.8	17.5	16.6	18.5	14.8	17.3	17.4	16.1
Psychiatrists	44.9	46.6	43.3	44.0	46.6	44.7	44.6	42.0
Other	13.3	14.4	16.0	20.0	15.1	13.8	14.8	17.0
All	14.0	14.5	14.6	14.8	14.4	14.9	15.3	15.4

[a]Includes neurologists.

cians, on the other hand, spend only about 12.3 minutes with their patients, on average. Cardiologists and other medical specialists* have the longest visits of any group except psychiatrists, presumably reflecting their greater reliance on extensive diagnostic work-ups, as seen in the next subsection. The much shorter visits of allergists and dermatologists probably reflects their less complex casemix and more routinized practice style. Among the surgical specialists, visit lengths for ophthalmologists are the longest (about 18.9 minutes, on average), presumably because they involve time-consuming eye examinations. By contrast, otolaryngologists spend only about two-thirds as much time with their patients.

3.2.2 Diagnostic Services by Specialty

Exams

During an office visit, a physician may provide a general or limited exam to a patient, but almost by definition, would not provide both. Because the two may be substitutes, it is appropriate to analyze general and limited exams together, as we do in this section and throughout the remainder of this report.

As seen in Table 3-6, the trend towards performing more limited exams and histories appears to be specialty-wide. Except for the internists, who had high levels to start with, primary care physicians increased their rates of limited exams 14-42 percent from 1975 to 1981.** By 1981, the exam rates of these physicians appears much more homogeneous, with about two-thirds of all visits including some sort of limited exam. Pediatricians continue to have somewhat lower levels, primarily due to their greater use of more general exams (30% vs. 13-20% for the other specialties, see Table 3-7).

For the medical and surgical subspecialists, the increase in limited exams is even more dramatic. Ophthalmologists have more than doubled their use of limited exams (from 41.5% in 1975 to 97.5% in 1981), with other surgical

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*Includes neurologists, gastroenterologists, hematologists, pulmonary disease specialists, etc.

**Although FPs also had high rates of limited exams in 1975, the tremendous drop between 1975-76 makes these figures suspect. Small sample sizes may explain the variability of limited exams for FPs in the early survey years, as the family practice board, used to define FPs, was not instituted until 1969. Because there is some lag between fulfilling residency requirements and actually taking the specialty board, FPs began to increase in number only around the mid-70's.

TABLE 3-6

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING LIMITED EXAMS/HISTORIES BY SPECIALTY OVER TIME

	1975	1976	1977	1978	1979	1980	1981
FPs	66.8	50.2	58.4	69.3	69.7	69.4	70.2
GPs	54.0	58.2	64.8	63.0	65.2	63.5	61.3
General Surgeons	47.5	46.1	52.2	69.0	64.5	69.6	62.1
Internists	60.8	55.6	57.0	61.6	63.6	61.3	64.4
OB-GYNs	54.6	51.2	57.2	57.8	63.6	59.4	68.7
Pediatricians	41.0	40.7	38.9	46.3	53.6	57.8	58.2
Allergists	23.1	63.9	46.6	22.3	12.9	33.2	31.4
Cardiologists	47.6	68.5	41.3	61.7	63.0	54.6	60.4
Dermatologists	40.9	52.5	61.7	79.9	69.0	68.0	72.4
Other medical specialists[a]	46.2	53.1	55.0	59.4	56.5	56.6	60.2
Ophthalmologists	41.5	43.7	58.1	72.1	83.1	97.2	97.5
Orthopedic Surgeons	56.9	53.8	62.6	73.1	67.3	61.4	75.4
Otolaryngologists	53.0	58.0	66.9	75.8	83.0	84.1	75.8
Urologists	56.5	48.2	50.1	57.7	56.0	59.0	58.1
Other surgical specialists	41.2	50.3	59.2	82.1	73.8	82.1	69.9
Psychiatrists	4.4	10.9	11.4	18.0	12.9	11.6	8.3
Other	53.2	57.3	55.4	66.7	72.2	53.5	91.0
All	51.3	51.9	56.3	61.8	63.0	63.8	64.9

[a]Includes neurologists.

TABLE 3-7

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING GENERAL EXAMS/HISTORIES BY SPECIALTY OVER TIME

	1975	1976	1977	1978	1979	1980	1981
FPs	11.5	11.8	22.4	19.9	15.2	12.2	12.9
GPs	12.8	15.3	18.1	21.4	14.5	15.4	16.2
General Surgeons	11.2	13.7	22.4	14.2	16.6	16.3	19.6
Internists	20.0	22.4	24.7	24.5	18.5	18.8	17.3
OB-GYNs	24.9	21.7	30.3	29.4	18.0	19.5	15.8
Pediatricians	33.6	29.8	44.5	42.2	30.4	29.0	30.2
Allergists	5.9	12.1	6.9	3.7	4.6	12.3	9.3
Cardiologists	21.9	19.0	32.4	24.5	19.3	26.8	21.4
Dermatologists	3.3	4.8	8.4	9.5	22.3	4.0	3.5
Other medical specialists[a]	19.5	24.1	23.5	19.4	25.8	29.7	25.3
Ophthalmologists	15.3	15.8	18.4	6.6	7.1	0.9	0.7
Orthopedic Surgeons	10.2	11.5	13.8	15.2	16.2	13.9	7.6
Otolaryngologists	11.9	8.9	18.1	11.7	8.0	8.8	7.3
Urologists	11.1	15.9	17.2	13.6	14.8	13.2	10.6
Other surgical specialists	14.1	9.7	18.1	11.5	14.0	8.8	6.5
Psychiatrists	2.3	2.9	4.7	2.8	5.1	4.7	2.7
Other	14.6	10.0	16.0	8.1	21.4	7.9	37.0
All	15.7	16.9	22.4	21.3	16.8	15.8	15.1

[a]Includes neurologists.

specialists and dermatologists not far behind. Urologists are the only subspecialty group who don't show a large increase in limited exams, possibly because they had above average rates to start with.

It's interesting to note that while limited exams are on the rise for the subspecialties, general exams are declining in frequency (Table 3-7), at least for the surgical subspecialties. Together these findings indicate a trend toward less comprehensive examinations, which may be due in part to a changing mix of new and old patients. As access to specialists' care improves, and new patients become a smaller proportion of physicians' office practices, we would expect limited exams to be substituted for more intensive (and expensive) diagnostic work-ups.

Several of the primary care specialties also appear to be substituting limited for general exams: internists, OB-GYNs and pediatricians all provided notably fewer general exams in 1981 than they did in 1975. Just the opposite is true of general and family practitioners and general surgeons, however, who increased their use of general exams by 27, 12 and 75 percent, respectively, over the seven year period. Why are these three specialties, most notably general surgeons, providing so many more general exams over time? A changing casemix may be one explanation; if the disease mix of these physicians were becoming progressively more complex, they should be performing more extensive diagnostic work-ups. (In Chapter 5 we analyze the time trend in both limited and general exams holding casemix constant.) Alternatively, physician competition may provide another explanation. General surgeons in particular may be moving into the primary care market as competition heightens due to an oversupply of surgeons.

Lab Tests and X-Rays

Earlier we saw that laboratory tests, and to a lesser extent x-rays, have been increasing over time, even though our NAMCS measures of these variables may underestimate the trend considerably. In Table 3-8 we see that a major source of the increase in lab tests is both the growing body of secondary specialists, and more testing by the primary care practitioners as well. With the exception of general surgeons and internists, all primary care physicians have increased their use of laboratory tests over the 1974-81 period by 10-20 percent. Lab tests by FPs are growing particularly rapidly--21 percent over the 1974-81 period compared with a 10 percent increase for GPs. (In published NAMCS data, where general and family practitioners are combined, it appears that lab tests are increasing quite rapidly for GPs and FPs as a group. Once

TABLE 3-8

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING CLINICAL LABORATORY TESTS OVER TIME BY SPECIALTY

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	22.8	23.4	24.6	25.7	25.0	24.7	25.5	27.5
GPs	17.3	21.1	23.1	19.1	18.7	23.6	18.9	19.0
General Surgeons	10.7	12.1	13.1	9.3	11.2	12.1	7.1	9.8
Internists	34.0	39.0	35.7	33.9	33.0	38.8	34.7	33.7
OB-GYNs	36.2	52.7	50.7	43.1	37.8	41.2	42.6	42.1
Pediatricians	22.9	22.5	22.1	22.7	23.4	25.6	25.0	26.2
Allergists	10.5	6.0	4.8	11.9	5.7	4.1	17.7	23.6
Cardiologists	51.7	25.3	29.6	26.6	37.6	25.5	31.6	24.8
Dermatologists	5.8	5.4	4.6	7.4	8.2	10.6	8.8	9.2
Other medical specialists[a]	29.9	18.0	23.6	40.8	25.5	29.1	29.1	21.5
Ophthalmologists	3.2	2.6	1.0	1.6	2.4	1.1	0.8	0.3
Orthopedic Surgeons	1.6	1.1	1.9	0.7	1.7	2.0	2.5	1.6
Otolaryngologists	7.7	3.9	1.1	3.6	5.8	3.8	3.4	3.4
Urologists	55.4	66.5	66.6	69.4	70.6	76.2	63.6	72.8
Other surgical specialists	4.5	2.1	3.9	2.6	4.7	1.8	3.0	8.9
Psychiatrists	2.4	0.6	2.8	1.7	1.5	2.3	0.5	2.8
Other	18.1	18.2	9.4	10.9	11.2	18.9	8.0	9.0
All	19.1	22.9	22.7	21.4	20.8	23.2	21.8	22.1

[a]Includes neurologists.

TABLE 3-9

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING X-RAYS OVER TIME BY SPECIALTY

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	7.7	9.1	6.7	6.9	8.6	7.8	7.6	7.3
GPs	6.0	5.8	6.6	6.9	7.4	7.1	6.3	6.3
General Surgeons	7.0	7.4	9.5	9.5	7.9	9.3	8.6	7.3
Internists	13.3	13.0	13.4	14.6	17.0	13.8	13.0	13.8
OB-GYNs	2.1	1.8	1.7	1.8	1.1	1.3	1.8	1.4
Pediatricians	2.6	4.1	2.8	2.5	2.6	2.8	2.3	2.2
Allergists	1.7	2.8	4.1	0.8	0.9	1.7	5.5	3.2
Cardiologists	23.5	14.8	19.4	12.8	15.2	13.7	22.8	12.0
Dermatologists	2.5	1.8	0.4	0.4	0.1	0.1	8.1	0.2
Other medical specialists[a]	17.7	14.8	12.0	12.8	12.6	18.4	8.8	9.8
Ophthalmologists	0.2	0.3	0.2	1.6	0.2	0.2	0.4	0.1
Orthopedic Surgeons	32.0	36.9	36.2	43.2	40.2	36.8	36.3	41.5
Otolaryngologists	3.8	5.5	6.4	4.1	6.3	3.2	5.3	2.9
Urologists	7.3	8.6	9.2	10.3	10.4	9.9	5.4	9.3
Other surgical specialists	6.9	6.6	6.1	12.2	11.6	9.4	8.0	6.5
Psychiatrists	0.4	0.6	0.8	0.1	0.2	0.2	0.0	0.4
Other	18.2	10.4	11.5	7.7	9.8	9.2	4.7	11.9
All	7.1	7.4	7.7	7.8	8.2	8.2	7.3	7.6

[a]Includes neurologists.

the two specialties are separated, however, we see that FPs are really the driving force behind this increase.) The fact that internists are not using more lab tests over time is interesting in itself given the nature of their practice and casemix. It may be that internists have reached an "upper limit" in their lab test utilization, ordering them for all visits deemed necessary. It's also possible that they are providing more lab tests per visit, which wouldn't be captured in our measure. As far as the secondary specialists are concerned, only urologists show a consistent increase in lab test utilization over the period.

There were few time trends in x-ray use at the specialty level (see Table 3-9). Only orthopedic surgeons have increased their reliance on x-rays over time: whereas about one-third of visits to orthopedic surgeons involved x-rays in 1974, nearly 42 percent did by 1981 (an increase of 30% over the eight-year period).

As for inter-specialty differences generally, internists, cardiologists, and "other" medical specialists tend to have above average levels for both lab and x-ray utilization. This is consistent with the hypothesis that the more extensive diagnostic workups commonly done by these specialists contribute to their above average visit lengths. The very high lab test and x-ray rates for urologists and orthopedic surgeons, respectively, are also consistent with the nature of their casemix. Allergists, dermatologists, ophthalmologists, otolaryngologists and naturally, psychiatrists, make almost no use of either of these services.

Almost without exception, FPs use both lab tests and x-rays more intensively than GPs. Again, this confirms our hypothesis that the FP sample is increasingly composed of residency-trained FPs, who have a more intensive, technology-oriented practice style compared with GPs or other FPs. This trend is especially true of lab tests; in 1981, for instance, FPs prescribed lab tests for over 27 percent of their patients compared with only 19 percent for GPs.

Blood Pressure Checks and ECGs

Earlier we observed that while checking blood pressures was becoming a more integral part of every office visit, the use of electrocardiograms has been fairly constant. Specialty-specific data on these two services may shed some light on this anomaly (Tables 3-10 and 3-11). The two specialties most likely to care for cardiac patients, internists and cardiologists, show no real change in blood pressure checks, but a marked decline in ECGs.

TABLE 3-10

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING BLOOD PRESSURE CHECKS BY SPECIALTY OVER TIME

	1975	1976	1977	1978	1979	1980	1981
FPs	38.7	43.5	46.3	47.3	50.0	40.1	44.2
GPs	40.4	42.5	42.3	44.4	51.5	48.3	43.5
General Surgeons	23.4	22.8	21.7	22.9	26.4	18.3	30.3
Internists	60.2	58.3	59.2	54.8	59.0	58.0	65.0
OB-GYNs	57.4	61.9	65.9	65.5	64.8	69.4	67.3
Pediatricians	7.8	10.2	8.2	8.4	9.8	7.6	8.7
Allergists	10.0	8.3	16.8	3.0	5.5	16.7	16.8
Cardiologists	72.7	69.0	71.4	71.6	64.7	76.7	71.7
Dermatologists	0.4	1.5	2.8	0.1	0.5	1.7	0.8
Other medical specialists[a]	41.1	39.8	40.8	32.1	45.9	45.0	46.1
Ophthalmologists	1.3	2.7	1.4	0.7	0.6	1.4	2.9
Orthopedic Surgeons	1.3	1.6	1.6	0.7	0.8	3.7	2.2
Otolaryngologists	2.5	0.8	4.7	3.8	1.2	1.2	1.0
Urologists	10.8	16.7	8.6	8.1	14.5	11.3	8.1
Other surgical specialists	8.4	11.2	9.0	16.9	7.4	13.4	7.9
Psychiatrists	2.2	7.3	4.4	1.2	2.3	3.9	2.7
Other	35.2	30.6	18.4	23.5	47.5	23.5	64.3
<u>All</u>	33.2	33.2	34.0	33.3	36.0	33.8	34.7

[a]Includes neurologists.

TABLE 3-11

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING ELECTROCARDIOGRAMS BY SPECIALTY OVER TIME

	1975	1976	1977	1978	1979	1980	1981
FPs	2.5	1.9	2.8	3.2	2.7	2.0	2.7
GPs	2.3	2.6	2.2	2.2	2.0	1.9	1.9
General Surgeons	2.0	1.2	0.9	1.1	1.4	0.8	1.4
Internists	13.9	14.1	13.9	14.9	11.2	11.1	13.0
OB-GYNs	0.3	0.5	0.2	0.1	0.1	0.5	0.2
Pediatricians	0.2	0.3	0.1	0.3	0.4	0.4	0.3
Allergists	0.9	0.1	0.3	0.0	0.4	3.1	1.6
Cardiologists	41.5	35.7	29.7	41.1	21.7	41.4	33.1
Dermatologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other medical specialists[a]	6.1	6.8	6.0	6.6	7.9	9.5	3.5
Ophthalmologists	0.1	0.0	0.1	0.0	0.1	0.6	0.3
Orthopedic Surgeons	0.1	0.2	0.1	0.3	0.0	0.0	0.1
Otolaryngologists	0.0	0.0	0.0	0.3	0.1	0.0	0.1
Urologists	0.6	1.2	0.5	0.3	0.0	0.2	0.3
Other surgical specialists	0.9	1.4	1.7	4.9	1.4	0.9	1.4
Psychiatrists	0.1	0.4	0.0	0.2	0.0	0.0	0.3
Other	2.9	4.4	0.9	0.7	2.3	1.5	6.2
All	3.4	3.3	3.0	3.4	2.7	2.8	3.2

[a]Includes neurologists.

Internists prescribed 6.9 percent fewer ECGs in 1981 than in 1975, while cardiologists cut their rate by one-quarter.*

Other primary care physicians, even pediatricians, have greatly increased the blood pressure checks they perform: 8-30 percent. The general aging of the population may be one explanation; another may be a growing awareness of the relationship of hypertension to other illnesses.

Other Tests

Endoscopies are so infrequently ordered or performed in the office setting that even disaggregation by specialty does not help identify time trends (see Table 3-12). The specialties most likely to prescribe endoscopies are subject to a great deal of sampling variability: cardiologists, gastroenterologists (included with "other medical specialists"), and urologists. General surgeons show some evidence of ordering more endoscopies, but even for this large specialty group, there is tremendous fluctuation from year to year.

Ophthalmologists naturally are most likely to order vision tests, which they did in four out of every five visits during 1981 (Table 3-13). This figure is about 11 percent higher than their 1975 rate, explaining the increase in vision tests observed overall. The only other specialty to order vision tests with any frequency, pediatricians, have shown little change in their utilization over the 1975-81 period, performing vision tests in about 4 percent of office visits.

Finally, the decline in Pap tests noted earlier is apparent for nearly every primary care specialty group (see Table 3-14). For OB-GYNs, who are the most likely to order Pap tests, the drop is the largest: more than 7 percentage points over the five years (from 36.6% in 1977 to 29.5% in 1981). The most probable explanation for this result is a changing medical protocol; whereas one Pap test per year used to be the accepted practice, the American Cancer Society has stated that only one every two years, or even every five, is now necessary. As more and more physicians adopt this new standard, we would expect Pap tests to decline.

*Both of these declines may simply be due to sampling. In both 1978 and 1980, cardiologists used ECGs at the same rate as in 1975. In the other years, however, ECG utilization does seem to have fallen off. The large drop in ECGs for internists comes exclusively between 1978-79, and actually appears to be rebounding in 1981.

TABLE 3-12

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING ENDOSCOPIES BY SPECIALTY OVER TIME

	1975	1976	1977	1978	1979	1980	1981
FPs	1.0	1.8	0.7	0.7	0.7	0.4	0.4
GPs	0.6	0.8	0.6	0.3	1.9	0.4	0.3
General Surgeons	1.2	1.4	2.0	2.2	1.5	2.2	2.5
Internists	1.6	1.5	2.5	3.1	1.3	1.1	1.8
OB-GYNs	1.1	0.8	1.3	0.7	2.5	0.4	1.2
Pediatricians	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Allergists	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Cardiologists	2.5	0.6	1.4	1.3	2.4	1.7	1.0
Dermatologists	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Other medical specialists[a]	4.7	2.6	2.2	4.1	6.6	3.0	5.2
Ophthalmologists	3.0	4.3	1.3	0.0	0.1	0.2	0.0
Orthopedic Surgeons	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Otolaryngologists	0.2	0.8	0.4	0.6	1.0	0.8	0.1
Urologists	8.9	7.7	10.4	7.4	4.6	6.1	5.2
Other surgical specialists	0.1	1.0	0.5	0.0	0.0	0.3	8.1
Psychiatrists	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	8.7	3.8	11.6	7.0	3.4	1.6	0.6
All	1.2	1.2	1.2	1.0	1.3	0.8	1.0

[a]Includes neurologists

TABLE 3-13

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING VISION TESTS BY SPECIALTY OVER TIME

	1975	1976	1977	1978	1979	1980	1981
FPs	1.8	1.3	0.9	2.2	3.1	1.5	1.4
GPs	1.3	1.6	0.9	1.0	2.1	1.2	1.3
General Surgeons	0.6	1.6	0.6	0.2	0.5	2.9	1.2
Internists	2.4	1.4	2.1	2.2	1.3	1.4	1.7
OB-GYNs	0.2	0.4	0.1	0.1	0.1	0.1	0.0
Pediatricians	4.2	4.4	3.3	2.5	4.4	3.8	3.8
Allergists	0.3	0.1	0.0	0.0	0.0	2.2	1.7
Cardiologists	0.7	2.1	0.4	1.2	0.5	0.4	0.1
Dermatologists	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Other medical specialists[a]	0.8	3.1	2.3	2.4	3.5	4.0	0.9
Ophthalmologists	73.9	73.2	62.3	67.0	79.5	83.5	81.9
Orthopedic Surgeons	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Otolaryngologists	2.3	3.9	1.8	2.9	5.8	0.4	0.0
Urologists	0.0	0.0	0.3	0.0	0.1	0.0	0.0
Other surgical specialists	7.7	5.3	1.1	0.3	0.5	0.4	0.5
Psychiatrists	0.3	0.0	0.1	0.0	0.6	0.1	0.0
Other	8.7	2.7	3.5	0.0	1.5	0.6	15.8
All	4.7	5.2	4.0	4.8	6.0	5.7	5.8

[a]Includes neurologists.

TABLE 3-14

CHANGES IN PAP TESTS BY SPECIALTY OVER TIME

	1977	1978	1979	1980	1981
FPs	4.4	4.8	5.3	4.4	3.9
GPs	3.9	3.1	3.8	2.9	2.4
General Surgeons	2.2	2.0	1.9	0.9	1.2
Internists	3.9	4.1	3.7	2.7	3.6
OB-GYNs	36.6	31.0	31.0	29.3	29.5
Pediatricians	0.0	0.1	0.1	0.1	0.1
Allergists	0.0	0.0	0.2	0.3	0.5
Cardiologists	1.1	1.5	1.7	2.6	0.9
Dermatologists	0.0	0.0	0.0	0.1	0.1
Other medical specialists[a]	0.8	1.6	1.6	1.5	1.0
Ophthalmologists	0.0	0.0	0.0	0.0	0.0
Orthopedic Surgeons	0.0	0.0	0.0	0.0	0.0
Otolaryngologists	0.0	0.0	0.0	0.0	0.0
Urologists	0.5	0.2	0.5	0.1	0.2
Other surgical specialists	0.0	0.0	0.0	0.0	0.0
Psychiatrists	0.3	0.1	0.0	0.0	0.1
Other	0.9	1.3	1.4	1.7	0.9
All	5.4	4.9	4.9	4.4	4.3

[a]Includes neurologists.

3.2.3 Therapeutic Services by Specialty

Drugs

Because of inconsistencies across survey years in the collection and coding of medication therapy, only the last two years' worth of data on physicians' drug-prescribing practices are presented by specialty (see Table 3-15). Allergists had the highest rates of drug therapy of all the specialties, using some form of medication in 9 out of 10 patients. Of the primary care practitioners, the two surgical specialties (general surgery and OB-GYN) turn to drug therapy far less frequently than other physicians. While other primary care physicians prescribe some sort of medication to three out of every four office patients, general surgeons and OB-GYNs provide drugs to only about half that many. Similar results are evident for the secondary specialists, with the surgical subspecialists far less likely to prescribe drugs than medical subspecialists, as expected. Casemix differences undoubtedly explain the bulk of this interspecialty variation in drug prescribing practices.

Office Surgery

Office surgery is an important component of office visits for general surgeons, dermatologists, and for all of the surgical subspecialists except ophthalmologists (Table 3-16). Dermatologists perform surgery in over one-third of their visits, twice as often as any other specialty. Of course, the resource use associated with the surgical procedures is very different; dermatologists are probably removing warts while surgeons may be suturing lacerations or setting broken bones.

Although time trends are difficult to establish with so much year-to-year variation, urologists do seem to be doing less office surgery over time. GPs, OB-GYNs and pediatricians, by contrast, seem to be doing more. Even though these three specialty groups have low rates of surgery in absolute terms, any changes in their surgery rates will have a disproportionate effect on office surgery rates overall since they account for such a large portion of all U.S. office visits. This is undoubtedly why surgery rates are rising slightly for the U.S. as a whole.

Counselling and Psychotherapy

That medical counselling is gaining in popularity among all physicians is evident in Table 3-17. Virtually every specialty is spending time counselling more and more of their patients. Almost all of the primary care specialties

TABLE 3-15

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING DRUGS BY SPECIALTY: 1980-1981

	1980	1981
FPs	73.7	70.9
GPs	76.0	72.5
General Surgeons	33.7	40.6
Internists	76.7	76.4
OB-GYNs	43.5	39.7
Pediatricians	71.0	72.4
Allergists	83.5	90.9
Cardiologists	67.6	75.5
Dermatologists	76.9	71.9
Other medical specialists[a]	75.4	69.5
Ophthalmologists	41.1	36.5
Orthopedic Surgeons	29.6	27.1
Otolaryngologists	51.0	52.3
Urologists	46.9	44.3
Other surgical specialists	29.7	21.1
Psychiatrists	36.0	36.4
Other	75.5	43.0
All	63.1	60.6

[a]Includes neurologists

TABLE 3-16

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING OFFICE SURGERY BY SPECIALTY OVER TIME

	1975	1976	1977	1978	1979	1980	1981
FPs	6.3	4.4	6.0	7.2	5.4	5.3	6.3
GPs	5.0	5.4	6.0	5.9	4.7	4.8	5.7
General Surgeons	16.5	18.7	19.3	20.9	20.0	16.8	14.4
Internists	1.4	1.3	2.1	1.6	1.6	2.2	1.6
OB-GYNs	3.1	4.1	5.4	5.5	5.3	4.6	5.0
Pediatricians	3.2	4.2	2.3	3.7	4.5	8.3	6.0
Allergists	0.4	0.8	6.9	1.3	1.6	0.7	1.1
Cardiologists	0.7	0.8	0.8	0.1	1.3	0.6	0.2
Dermatologists	36.6	27.6	38.4	32.6	39.4	33.9	36.7
Other medical specialists[a]	2.2	1.0	1.0	1.2	1.3	1.4	2.7
Ophthalmologists	4.5	4.4	6.6	4.5	4.2	2.7	3.2
Orthopedic Surgeons	13.0	15.3	18.4	16.9	15.9	11.7	12.2
Otolaryngologists	11.5	11.2	17.8	14.3	16.4	10.6	12.3
Urologists	20.1	17.3	22.4	16.8	16.7	16.9	15.2
Other surgical specialists	16.4	19.0	10.9	18.9	18.6	18.3	16.2
Psychiatrists	0.2	0.0	0.6	0.1	0.2	0.0	0.1
Other	10.6	17.7	10.8	14.0	6.1	9.9	6.4
All	6.7	7.1	7.9	7.7	7.4	7.5	7.3

[a]Includes neurologists.

TABLE 3-17

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING MEDICAL COUNSELLING BY SPECIALTY OVER TIME

	1975[a]	1976[a]	1977	1978	1979	1980	1981
FPs	16.8	17.7	26.3	25.2	23.6	26.5	26.0
GPs	10.9	11.1	17.2	16.9	20.7	22.0	19.4
General Surgeons	12.3	11.0	18.1	16.3	19.0	19.3	21.2
Internists	17.2	19.9	35.5	30.3	32.1	31.7	35.3
OB-GYNs	11.5	11.9	21.9	24.7	21.7	24.9	26.3
Pediatricians	15.7	16.2	21.5	20.1	19.6	26.5	22.6
Allergists	3.7	24.1	16.5	1.5	8.9	19.1	24.5
Cardiologists	7.0	17.0	36.5	23.0	41.2	27.6	38.3
Dermatologists	12.6	14.3	7.4	14.0	12.2	14.6	5.1
Other medical specialists[b]	24.9	15.6	36.2	23.4	37.9	33.6	41.8
Ophthalmologists	3.7	5.5	8.6	8.5	16.3	17.1	11.1
Orthopedic Surgeons	16.8	16.3	19.6	21.1	31.9	15.0	18.0
Otolaryngologists	9.5	12.5	16.3	15.9	17.1	33.3	17.1
Urologists	7.6	11.8	24.5	12.5	25.3	17.1	34.4
Other surgical specialists	16.3	18.5	16.1	28.1	19.6	26.5	26.5
Psychiatrists	5.9	3.4	3.6	3.2	4.6	3.7	4.0
Other	10.6	17.7	10.6	7.8	23.9	35.7	33.1
All	12.3	13.6	20.6	19.4	22.2	23.2	22.9

[a]These figures include diet counselling; a service which was specified separately in later survey years.

[b]Includes neurologists.

TABLE 3-18

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING DIET COUNSELLING BY SPECIALTY OVER TIME

	1977	1978	1979	1980	1981
FPs	9.0	8.9	7.2	8.6	11.4
GPs	7.7	8.9	7.8	12.6	8.2
General Surgeons	3.5	3.1	3.1	2.8	5.9
Internists	13.2	11.8	9.1	12.9	12.9
OB-GYNs	6.5	9.2	5.7	7.3	7.9
Pediatricians	8.3	12.3	9.5	11.2	11.6
Allergists	3.7	2.4	0.4	4.6	3.5
Cardiologists	9.3	8.9	8.3	12.1	10.3
Dermatologists	4.5	0.6	1.1	2.6	0.5
Other medical specialists[a]	6.0	7.8	8.2	11.3	8.3
Ophthalmologists	0.0	0.0	0.0	0.0	0.1
Orthopedic Surgeons	0.7	0.2	0.4	2.0	0.8
Otolaryngologists	1.1	0.2	0.1	1.3	1.0
Urologists	2.8	1.0	1.3	2.3	3.3
Other surgical specialists	0.9	1.0	0.6	1.5	1.3
Psychiatrists	4.5	0.8	0.7	1.6	1.7
Other	5.0	11.4	18.0	13.0	9.1
All	6.9	7.4	6.0	8.5	7.6

[a]Includes neurologists.

TABLE 3-19

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING PSYCHOTHERAPY/THERAPEUTIC LISTENING BY SPECIALTY OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	2.4	2.3	7.1	3.8	2.7	2.5	2.3	2.8
GPs	2.3	3.0	1.7	2.4	2.9	2.0	2.4	2.5
General Surgeons	1.2	1.8	0.8	0.8	2.1	1.0	0.7	1.4
Internists	3.9	2.7	3.0	5.6	4.3	3.3	5.3	5.0
OB-GYNs	2.0	0.6	2.0	4.5	3.7	1.3	3.6	1.8
Pediatricians	2.8	0.7	0.9	0.8	1.0	1.0	1.8	1.0
Allergists	0.9	0.0	1.5	0.5	0.0	0.3	0.0	0.4
Cardiologists	5.4	2.5	3.4	2.5	3.3	1.7	4.6	4.6
Dermatologists	1.4	1.1	0.3	0.9	0.3	0.7	0.5	0.7
Other medical specialists[a]	5.1	4.6	3.2	7.9	2.6	6.3	16.5	11.0
Ophthalmologists	0.7	0.2	0.6	0.5	0.9	0.3	1.1	1.1
Orthopedic Surgeons	1.5	0.6	1.3	6.8	3.0	0.8	0.4	0.2
Otolaryngologists	0.8	0.4	0.3	0.4	0.1	0.7	0.6	0.7
Urologists	0.4	0.3	3.0	1.7	1.3	0.5	0.8	1.0
Other surgical specialists	1.2	1.6	1.9	1.9	4.0	1.4	4.2	1.9
Psychiatrists	82.1	89.9	90.6	91.6	97.4	90.6	92.8	91.8
Other	2.9	1.0	4.0	0.8	1.6	2.6	0.6	1.3
<u>All</u>	4.4	4.3	4.1	5.4	5.0	4.4	5.0	4.8

[a]Includes neurologists.

have nearly doubled the share of their office visits including medical counselling in just seven years. A growing awareness of the importance of life style to health status is undoubtedly a major contributing factor to this increase. Internists, cardiologists, and other medical specialists do the most counselling, with about one out of every three office patients given advice on diet, exercise, or other health-related behavior. This certainly contributes to the much longer visit lengths reported by these physicians. When diet counselling was added as a separate service, these medical specialties report above average rates for this as well: 10-13 percent of visits versus 8 percent for all physicians (Table 3-18). FPs and pediatricians also seem to provide a fair amount of diet counselling in their practices.

Not surprisingly, psychiatrists are most likely to provide psychotherapy or therapeutic listening (Table 3-19); they do so in about 90 percent of all office visits with no apparent changes over time. What is surprising is the number of non-psychiatrists who report that they, too, provide this service. GPs, FPs, internists, OB-GYNs, cardiologists, and other medical specialists report listening to patient problems in 1-5 percent of their office visits. Table 3-19 implies that about 2.4 percent of all office visits in 1981 (14 million) involved psychotherapy/therapeutic listening delivered by non-psychiatrists. How do they bill for this service? Presumably therapeutic listening takes time, so perhaps an intermediate visit becomes a complex visit, or a brief visit an intermediate one? If so, this may explain some of the visit procedure inflation observed by third party payors (Holahan and Scanlon, 1978; Sobaski, 1975). In the final report of this project we will explore the provision of psychotherapy by non-psychiatrists in further detail.

Other Services

As seen in Table 3-20, physiotherapy is most frequently provided by orthopedic surgeons (21% of visits) and dermatologists (in about 9% of their visits). GPs also order physiotherapy at slightly above average rates (5.9% of visits versus 4.6% for all physicians), probably because survey DOs are largely concentrated in this specialty. (Physiotherapy includes manipulative therapy, the "unique" treatment modality offered by DOs.) Although all of these specialty groups have increased their use of physiotherapy over time, the bulk of this increase occurred during the last two years of the survey. (Only dermatologists show a more consistent trend over the period.) The source of this rather abrupt change is unclear, however, as neither an

TABLE 3-20

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING PHYSIOTHERAPY BY SPECIALTY OVER TIME

	1975	1976	1977	1978	1979	1980	1981
FPs	2.2	0.7	0.9	2.3	1.6	4.1	4.3
GPs	3.5	4.4	4.2	5.2	4.2	6.6	5.9
General Surgeons	1.0	1.4	1.8	1.4	1.8	3.3	4.7
Internists	1.2	0.9	2.0	1.8	1.1	4.8	3.6
OB-GYNs	0.2	0.5	0.4	0.5	0.3	2.3	0.5
Pediatricians	0.1	0.6	0.3	0.3	0.6	1.4	1.2
Allergists	0.0	0.5	1.4	0.3	0.0	0.0	0.6
Cardiologists	0.4	0.4	0.7	0.0	1.7	1.0	3.1
Dermatologists	5.5	7.2	14.0	13.1	11.1	9.9	8.6
Other medical specialists[a]	6.5	0.7	1.8	2.9	1.2	2.6	1.1
Ophthalmologists	0.1	0.2	0.6	1.1	0.5	1.1	1.8
Orthopedic Surgeons	5.2	12.6	15.6	18.0	13.7	21.9	21.4
Otolaryngologists	0.1	1.3	1.4	0.4	0.4	1.5	1.0
Urologists	0.2	1.9	7.2	1.5	1.6	4.2	1.1
Other surgical specialists	2.2	1.6	2.2	7.5	2.8	5.1	4.0
Psychiatrists	0.8	0.8	0.6	0.3	0.9	0.3	0.8
Other	7.8	16.5	26.8	19.1	11.9	10.3	20.1
All	2.2	3.0	3.3	3.6	3.1	5.1	4.6

[a]Includes neurologists.

TABLE 3-21

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING FAMILY PLANNING SERVICES BY SPECIALTY OVER TIME

	1977	1978	1979	1980	1981
FPs	1.0	1.3	1.4	1.6	1.4
GPs	0.9	0.9	1.0	1.3	1.2
General Surgeons	0.4	0.3	0.4	0.4	0.4
Internists	0.4	0.4	0.2	0.3	0.3
OB-GYNs	10.8	10.0	9.9	16.4	15.1
Pediatricians	0.6	0.1	0.5	0.2	0.2
Allergists	0.1	0.0	0.0	0.0	0.0
Cardiologists	0.2	0.1	0.1	0.3	0.1
Dermatologists	0.0	0.1	0.0	0.2	0.0
Other medical specialists[a]	0.5	0.4	0.5	0.1	0.0
Ophthalmologists	0.0	0.0	0.0	0.0	0.0
Orthopedic Surgeons	0.2	0.2	0.1	0.1	0.0
Otolaryngologists	0.0	0.0	0.0	0.1	0.0
Urologists	0.5	1.2	1.2	2.5	2.3
Other surgical specialists	0.0	0.3	0.0	0.0	0.1
Psychiatrists	0.2	0.2	0.2	0.5	0.2
Other	0.3	0.4	0.6	0.4	3.3
All	1.5	1.4	1.4	2.2	1.9

[a]Includes neurologists.

increase in the DO office visit share nor a change in survey wording provide an explanation.

The remaining therapeutic service, family planning, is most commonly provided by OB-GYNs (in about 15 percent of visits, Table 3-21), followed by urologists and general and family practitioners (1-2 percent). Moreover, the provision of family planning by each of these specialties appears to be on the rise.

3.2.4 Trends in Office Visit Content for DOs

Most studies of physicians focus solely on MDs, but the supply of DOs is now actually increasing even faster than that of MDs, as new osteopathic schools open and others expand. Although DOs represent only about 5 percent of the total physician stock, they account for a much larger share of those in primary care. In fact, by 1990, one-third of the nation's general/family practitioners are expected to be DOs (Medical World News, 1980). If the average DO's practice style differs systematically from the average MD's (and osteopaths say they do), then manpower projections need to include adjustments for the changing MD/DO mix. In Table 3-22, we present trends in office visit content and compare MD and DO general practitioners. (Although the NAMC survey includes DOs of all specialties in its design, sample sizes are adequate only for general practitioners.)

Osteopathic GPs do appear to use fewer diagnostic services than those who are MDs, but more therapeutic ones. They generally provide fewer examinations, fewer lab tests, fewer ECGs, and fewer vision tests. On the other hand, DOs perform far more physiotherapy (specifically, manipulative therapy) and (possibly) office surgery as well. They also appear to provide more therapeutic listening and diet counselling than MDs, but less medical counselling, suggesting that it may be just a question of semantics. There does not appear to be any difference in the amount of time these two groups spend with their office patients, though we will test for significant differences later in Chapter 5.0.

As for time trends, both MDs and DOs show increases in many of the same services, e.g., limited and general exams, physiotherapy, and medical counselling. In a few instances, like x-rays and lab tests, DOs appear to be increasing their use of the service, while MDs are reducing their reliance on the same service. Finally, the increase in length of visit for GPs found earlier appears to be attributable solely to the MDs. Their average visit length has increased nearly a minute from 1974 to 1981, while that of DOs actually appears to be falling.

TABLE 3-22

CHANGES IN OFFICE VISIT CONTENT AMONG GENERAL PRACTITIONERS: MDs VERSUS DOs

	1975	1976	1977	1978	1979	1980	1981
Limited Exam/History							
MD	56.1%	58.6%	64.1%	63.6%	66.2%	66.9%	61.8%
DO	46.1	55.8	68.3	59.7	61.1	53.0	59.5
General Exam/History							
MD	13.6	15.4	18.6	20.5	14.0	15.2	16.7
DO	9.4	14.5	15.6	25.8	16.4	15.9	14.8
Clinical Lab Tests							
MD	22.9	23.2	19.4	19.4	24.3	19.2	17.9
DO	14.1	22.5	17.9	14.9	20.8	17.9	22.2
X-Rays							
MD	6.3	6.7	6.8	7.7	7.0	6.3	5.5
DO	3.9	6.4	7.3	5.7	7.5	6.2	8.8
Blood Pressure Check							
MD	42.7	41.8	41.4	44.1	52.2	47.0	42.1
DO	31.4	46.4	47.0	45.8	48.5	52.3	47.6
ECG							
MD	2.5	2.7	2.3	2.1	2.1	2.1	2.1
DO	1.2	1.9	1.8	2.5	1.9	1.4	1.2
Vision Test							
MD	1.5	1.6	0.9	0.6	2.2	1.4	1.6
DO	0.6	1.3	1.0	1.0	1.8	0.5	0.5
Office Surgery							
MD	4.9	5.5	6.2	5.8	6.3	4.4	5.8
DO	5.2	5.2	4.9	5.9	9.0	6.0	5.6
Physiotherapy							
MD	1.7	2.4	2.1	1.8	1.8	3.9	4.0
DO	10.3	16.1	14.5	23.8	14.1	14.8	11.9
Medical Counselling							
MD	11.1	11.2	15.9	17.4	21.6	23.2	19.8
DO	10.4	10.6	24.1	14.0	16.9	18.1	17.9
Therapeutic Listening							
MD	1.6	1.3	2.1	4.3	1.6	2.0	1.9
DO	8.0	3.5	4.0	2.6	3.6	3.8	4.1
Diet Counselling							
MD	--	--	7.8	8.8	7.1	10.9	8.3
DO	--	--	7.0	9.7	11.0	17.9	7.8
LENGTH OF VISIT (minutes)							
MD	12.1	12.4	13.2	12.5	13.2	13.4	12.9
DO	14.5	13.7	13.6	12.4	12.3	13.6	13.0

3.3 Regional Trends in Office Visit Content

Utilization studies, whether of physician or hospital services, consistently show strong variations by geographic region and urban/rural location. The content of a physician's office visit may vary geographically as well, some parts of the country having longer visits or more intense ancillary use than others, *ceteris paribus*. In this section, we examine time trends for all of our visit content dimensions between SMSAs and non-SMSAs and the four major Census regions.

Before proceeding, however, let us examine the distribution of office visits across geographic areas (Table 3-23). Not surprisingly, three-fourths of all office visits (75.6% in 1981) take place in SMSAs, a figure which has changed little over the 1974-81 period. The South accounts for about one-third of all visits, largely because of its very large population base. (The U.S. Census defines the Southern region as ranging from Texas to the District of Columbia and from West Virginia to Florida.) The South also appears to have a growing proportion of visits, at the expense of the Northeast and North Central regions.

3.3.1 Length of Office Visit

Table 3-24 displays time trends in average office visit lengths by region and SMSA/non-SMSA. The Northeast and Western regions of the country appear to have consistently longer visits than the North Central and Southern regions. In part this may reflect the lower physician-population ratios in these latter two regions; physicians may spend less time with each patient in order to accomodate all patients seeking care. Longer office visits in the West, a full minute and one half more than the national average, are particularly noteworthy given the shorter hospital stays observed in this region.* Are Western physicians more inclined to substitute ambulatory for inpatient care? SMSA physicians also spend more time with patients than do those in non-SMSAs, either because of casemix differences (see Table 4-2 below) or the relative abundance of physicians in urban areas.

Although these urban/rural variations are consistent throughout our time-series, the differences definitely appear to be narrowing over time.

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*The average stay in community hospitals nationwide in 1980 was 7.6 days versus 6.6 and 6.5 days in the Mountain and Pacific Census regions, respectively (AHA, 1981, Table 5A-B).

TABLE 3-23

CHANGES IN OFFICE VISIT SHARES ACROSS GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs[a]

	1974	1975	1976	1977	1978	1979	1980	1981
Northeast	23.2	22.3	23.9	24.7	22.3	24.0	25.6	21.6
North Central	29.2	26.5	25.1	26.1	24.5	23.4	24.3	26.6
South	28.9	32.2	32.1	28.7	32.8	32.1	31.7	33.5
West	18.7	19.0	18.9	20.5	20.4	20.5	18.5	18.3
All SMSAs	75.3	72.9	73.7	76.3	73.7	73.5	76.4	75.6
All Non-SMSAs	24.7	27.1	26.3	23.8	26.3	26.6	23.6	24.4

[a]Columns sum to 100%.

TABLE 3-24

CHANGES IN AVERAGE LENGTH OF OFFICE VISIT (MINUTES) OVER TIME: GEOGRAPHIC REGION AND SMSAs/NON-SMSAs

	1974	1975	1976	1977	1978	1979	1980	1981
Northeast	15.7	16.3	16.3	16.1	15.9	15.7	15.8	16.0
North Central	12.2	13.1	13.5	12.9	12.9	13.1	13.2	13.6
South	14.1	13.7	13.3	14.3	14.1	15.0	15.6	15.6
West	14.2	15.9	16.0	16.1	15.2	15.9	16.6	17.0
All SMSAs	14.9	15.3	15.3	15.7	15.2	15.7	15.9	15.9
All Non-SMSAs	11.0	12.2	12.5	11.8	12.4	12.9	13.1	13.7
U.S.	14.0	14.5	14.6	14.8	14.4	14.9	15.3	15.4

Average visit lengths increased 24.5 percent in non-SMSAs from 1974-1981, compared with only 6.7 percent for SMSAs. Regional differences in visit lengths are also shrinking, at least among the Northeast, North Central and Southern regions of the country. The West, however, is a different story; here, visit lengths have grown almost 20 percent over the eight years (from an average of 14.2 minutes per visit to 17 minutes).

3.3.2 Diagnostic Services by Region

Exams

Earlier in Table 3-1, we saw that the percent of office visits involving a limited examination and history had increased 27 percent. In Table 3-25, we observe that this trend is consistent for all regions and both SMSAs and non-SMSAs, but is most marked for the Northeast and the West where the total rate of increase is 36-37 percent. Because limited exams were performed far less freqently in these parts of the country at the beginning of the time series, such large rates of increase merely close the gap across regions. It is also interesting to note that physicians in non-SMSAs are more likely to conduct such exams than their urban colleagues.

These geographic variations are better understood when we realize that areas with lower rates of limited exams have above average rates for general examinations (Table 3-26). General exams were performed in 15.5 percent of all SMSA office visits (in 1981), compared with 13.9 percent of non-SMSA visits. Similarly, the Northeast region (18.4%), and to a lesser extent the South (17.4%), average more general exams than the other two regions (11-12%). Summing the two services, some kind of exam and history was involved in 68 percent of all office visits in SMSAs in 1975 compared with 65 percent in non-SMSAs. By 1981, physicians in both areas report exam rates of about 80 percent. Thus the trend towards conducting exams in a pervasive one, with the bulk of this increase coming from physicians' greater reliance on more limited (and presumably less expensive) office examinations.

Lab Tests and X-Rays

Laboratory tests appear to be ordered for a growing number of patients in all regions, but the rate of increase is much less marked in the West and North Central parts of the country. More specifically, the use of lab tests by Northeastern and Southern physicians has increased by 30 and 15 percent, respectively, over the 1974-81 period, compared with a 2-7 percent increase in the other two regions. In every region, the largest jump occurs between 1974

TABLE 3-25

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING LIMITED EXAMS/HISTORIES OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975	1976	1977	1978	1979	1980	1981
Northeast	44.6	45.5	54.2	59.7	61.6	62.5	61.3
North Central	54.9	58.0	59.3	67.9	65.5	67.4	66.5
South	52.6	51.9	53.5	59.4	61.2	62.8	65.2
West	48.5	51.8	59.0	60.8	64.8	62.6	66.1
All SMSAs	50.9	51.7	55.3	60.6	61.7	62.8	64.1
All Non-SMSAs	52.3	52.5	59.6	65.4	66.8	67.1	67.5
U.S.	51.3	51.9	56.3	61.8	63.0	63.8	64.9

TABLE 3-26

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING GENERAL EXAMS/HISTORIES OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975	1976	1977	1978	1979	1980	1981
Northeast	18.9	22.5	25.7	25.1	19.8	19.4	18.4
North Central	14.4	16.0	22.2	18.5	15.1	13.0	12.1
South	16.0	14.2	23.4	23.3	17.3	16.8	17.4
West	13.8	15.4	17.1	17.1	14.3	12.6	11.5
All SMSAs	17.0	18.2	22.3	21.6	18.1	16.3	15.5
All Non-SMSAs	12.3	13.3	22.6	20.2	13.3	14.1	13.9
U.S.	15.7	16.9	22.4	21.3	16.8	15.8	15.1

and 1975. There are no stable time trends in lab test utilization for either SMSA or non-SMSAs, where rates are surprisingly similar.

A great deal of the increase in x-rays nationwide appears to be due to their proliferation in the South (Table 3-28) where the office x-ray rate increased 23 percent from 1974-81 compared with 7 percent nationally. Both the South and the West had relatively high rates of x-ray utilization in 1981: about 8.5 percent of all office visits involved x-rays in these regions compared with 6.6 percent of visits in other parts of the nation. X-rays are also more commonly ordered in SMSAs than in non-SMSAs, though here too the gap appears to be closing over time.

Blood Pressure Checks and ECGs

According to Table 3-29, the observed increase in blood pressure checks nationwide is almost exclusively due to a dramatic increase in the West (which had the lowest rates to start with). From 1974 to 1981, the number of blood pressure checks performed in the West grew almost 45 percent, to reach a level on par with the rest of the nation. As for SMSA/non-SMSA differences, blood pressure checks are more frequently performed in rural areas, though the absolute differences are not large (a few percentage points). Rates of increase in urban and rural areas have been quite similar.

Earlier, we noted that the use of electrocardiograms in physicians' offices had not increased over time, a surprising finding in light of high cardiac disease incidence rates. In Table 3-30, we see that electrocardiogram utilization has actually fallen slightly in the Northeast between 1974-81, and risen somewhat in the West. SMSAs show a fairly steady decrease in ECGs, but non-SMSA utilization rates have actually increased. While physicians in urban areas were one and a half times more likely to order ECGs in 1975, this differential had fallen to 67 percent by 1981. It appears as if ECGs have been falling off in popularity among urban physicians at the same time that they have been diffusing throughout rural areas. The end result may be a more optimal use of ECGs in the office throughout the country. Alternatively, physicians in SMSAs may be substituting ECG testing in the hospital for office-based procedures, a less than desirable trend.*

*Strictly speaking, we do not know whether the NAMC physician actually provided the ECG or whether he only ordered it. In the latter case, the locus of treatment could be the hospital.

TABLE 3-27

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING CLINICAL LAB TESTS OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1974	1975	1976	1977	1978	1979	1980	1981
Northeast	16.2	20.3	19.8	18.1	18.9	20.6	18.1	21.0
North Central	20.7	23.9	23.0	21.9	22.3	23.0	23.8	22.2
South	19.5	24.5	24.8	23.3	22.2	26.8	23.0	23.8
West	19.5	20.2	22.4	22.1	19.0	21.1	22.3	19.9
All SMSAs	20.2	22.8	21.9	21.3	21.0	23.2	21.5	22.0
All Non-SMSAs	15.7	22.9	25.0	21.7	20.3	23.3	23.0	22.3
U.S.	19.1	22.9	22.7	21.4	20.8	23.2	21.8	22.1

TABLE 3-28

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING X-RAYS OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1974	1975	1976	1977	1978	1979	1980	1981
Northeast	7.1	6.2	6.7	6.8	7.0	7.0	6.1	6.6
North Central	6.9	6.7	7.1	8.0	8.5	7.9	6.6	6.6
South	7.0	8.0	8.1	8.5	8.6	10.0	8.1	8.6
West	7.5	8.4	9.3	8.0	8.5	7.4	8.5	8.5
All SMSAs	7.7	8.0	8.0	8.3	8.6	8.8	7.3	8.0
All Non-SMSAs	5.1	5.6	7.1	6.4	7.0	6.8	7.1	6.6
U.S.	7.1	7.4	7.7	7.8	8.2	8.2	7.3	7.6

TABLE 3-29

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING BLOOD PRESSURE CHECKS OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975	1976	1977	1978	1979	1980	1981
Northeast	36.6	33.8	35.9	35.7	35.4	35.6	36.6
North Central	34.1	35.5	38.1	34.0	37.2	37.7	35.0
South	33.5	34.0	33.3	34.2	39.0	32.6	32.8
West	24.4	27.9	27.5	28.3	30.9	29.0	35.3
All SMSAs	32.3	32.8	32.9	32.7	34.4	33.1	34.1
All Non-SMSAs	34.7	34.1	37.5	35.1	40.7	36.7	36.3
U.S.	33.2	33.2	34.0	33.3	36.0	33.9	34.7

TABLE 3-30

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING ELECTROCARDIOGRAMS OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975	1976	1977	1978	1979	1980	1981
Northeast	4.3	4.0	3.6	3.7	3.3	2.7	3.6
North Central	2.9	3.2	2.3	3.2	2.3	2.7	2.2
South	3.4	2.4	3.3	3.9	3.0	2.9	3.2
West	2.6	4.1	2.9	2.6	2.2	3.2	3.9
All SMSAs	4.0	3.7	3.4	4.0	3.0	3.1	3.5
All Non-SMSAs	1.6	2.2	1.9	2.0	2.0	1.9	2.1
U.S.	3.4	3.3	3.0	3.4	2.7	2.8	3.2

Other Tests

Although the absolute levels of diagnostic endoscopies are probably too low to establish reliable time trends (less than 2 percent of visits), endoscopies do seem to be declining in frequency in the West (Table 3-31). It also appears that endoscopies are more commonly done in urban physicians' offices than in rural practices, though the absolute difference is very small.

As seen in Table 3-32, vision tests are becoming a more important component of visits in all regions. (Only in the Northeast, where vision tests were fairly common to begin with, was the rate of change in this service very slight.) There has been an especially large increase in vision tests in rural areas, which have more than doubled over the eight year period. By 1981, in fact, the substantial gap in eye exams between SMSAs and non-SMSAs existing in the early years of the survey had virtually disappeared.

The decline in Pap tests observed earlier is apparently due to their declining use in the Southern, and to a lesser degree, Western, parts of the country (Table 3-33), the two regions where rates were highest to begin with. Whereas 6.1 percent of office visits in the South involved Pap smears in 1977, only 3.9 percent did in 1981. This trend is also observed most acutely in urban areas, where Pap tests have fallen by about 21 percent in just five years. Even with this more rapid decline, however, Pap tests are performed with greater frequency in SMSAs than in non-SMSAs. There are two possible explanations for these trends. First, differences in population age-sex composition and specialty mix could explain the observed variation. Second, there has been a nationwide trend toward using fewer Pap tests, as discussed above in Section 3.2.2. If this change in protocol were being adopted at different rates across the country, we would expect to observe differential rates of change, as in fact we do.

3.3.3 Therapeutic Services

Drugs and Office Surgery

Although we are unable to look at intertemporal changes in medication therapy by region and SMSA/non-SMSA (because of data inconsistencies), we do note some interesting differences across these geographic areas (see Table 3-34). Most importantly, we find notably lower rates of drug utilization in physicians' offices in the West: 52.8 percent compared with a national average of 60.6 percent (for 1981). There are also urban/rural differences in drug utilization, with physicians in non-SMSAs relying somewhat more heavily on drug therapy than their urban colleagues.

TABLE 3-31

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING ENDOSCOPIES OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975	1976	1977	1978	1979	1980	1981
Northeast	1.3	1.0	1.5	0.9	0.8	0.8	1.2
North Central	0.9	1.5	1.1	1.5	1.4	0.6	0.6
South	1.0	1.0	0.2	0.9	2.0	0.8	0.7
West	2.0	1.2	1.2	0.8	0.7	1.2	1.6
All SMSAs	1.3	1.1	1.2	1.2	1.4	1.0	1.1
All Non-SMSAs	0.9	1.2	1.3	0.7	1.2	0.4	0.5
U.S.	1.2	1.2	1.2	1.0	1.3	0.8	1.0

TABLE 3-32

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING VISION TESTS OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975	1976	1977	1978	1979	1980	1981
Northeast	5.8	5.3	5.4	4.4	5.8	5.8	6.0
North Central	4.4	5.8	3.0	4.8	6.3	6.4	6.2
South	3.8	5.0	3.5	5.0	4.1	5.4	5.7
West	3.3	4.7	4.5	4.8	9.0	5.2	5.1
All SMSAs	5.4	5.8	4.4	5.2	7.0	6.3	5.8
All Non-SMSAs	2.8	3.5	2.8	3.7	3.4	3.7	5.7
U.S.	4.7	5.2	4.0	4.8	6.0	5.7	5.8

TABLE 3-33

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING PAP TESTS OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1977	1978	1979	1980	1981
Northeast	4.8	5.6	5.5	3.9	4.6
North Central	4.9	4.6	5.3	4.7	4.4
South	6.1	4.7	5.7	4.0	3.9
West	5.6	4.6	3.7	5.5	4.3
All SMSAs	5.7	5.0	5.1	4.5	4.5
All Non-SMSAs	4.4	4.5	4.6	4.3	3.7
U.S.	5.4	4.9	4.9	4.4	4.3

TABLE 3-34

CHANGES IN PERCENT OF DRUG VISITS ACROSS GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs[a]

	1980	1981
Northeast	64.1	61.1
North Central	64.0	61.8
South	66.3	63.5
West	55.8	52.8
All SMSAs	61.8	59.8
All Non-SMSAs	67.9	63.0
U.S.	63.1	60.6

Although office surgical treatment accounts for a growing share of all visits across the country (Table 3-35), there are no consistent trends in office surgery by region or SMSA/non-SMSA between 1975-81. Rates of office surgery tend to be highest in the West; 1-2 percentage points above rates for other regions in most years. One explanation for these high rates may be a substitution of surgery for drug therapy, though we have no way of testing this empirically.

Medical Counselling

Physicians in all parts of the country appear to have contributed to the tremendous upsurge in medical counselling (see Table 3-36). The Northeast region has somewhat higher levels, particularly in the last year of the survey (1981). It is noteworthy that physicians in non-SMSAs are as likely to provide such advice as are their (allegedly more sophisticated) urban colleagues. No consistent geographic trends are apparent for diet counselling (Table 3-37), although we do observe more diet counselling being done in the Northeast in every year. There also appears to be greater advice concerning diet by urban physicians compared with their rural counterparts, though the latter may be calling such counselling "medical" rather than "diet".

Other Services

As for the remaining services, most of the observed growth in physiotherapy appears to occur in SMSAs (Table 3-44), possibly due to the distribution of DOs. Physicians in the South use this treatment less frequently than others, though the differences are small.

Psychotherapy, or therapeutic listening, shows disproportionately large gains in the West compared with the rest of the country, but this may be partly due to their low levels to begin with (see Table 3-39). In 1981, the North Central region had by far the lowest rates of psychotherapy in the nation, even lower than in the South (3.2% compared with 4.4%). This service is provided at nearly three times the rate in SMSAs than it is in non-SMSAs: 5.6 percent vs. 2.1 percent in 1981, for example. Specialty distribution (i.e., psychiatrists) is undoubtedly one of the major factors here, as psychiatrists gravitate to large urban areas.

Finally, there are no stable trends in family planning services by SMSA/non-SMSA, though family planning has increased slightly in the Northeast and North Central regions between 1977 and 1981 (Table 3-40).

TABLE 3-35

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING OFFICE SURGERY OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975	1976	1977	1978	1979	1980	1981
Northeast	5.8	7.4	7.3	7.7	7.0	8.4	6.9
North Central	5.9	6.6	7.0	7.6	6.8	7.7	7.3
South	6.9	6.3	8.7	7.3	6.9	7.0	6.7
West	8.5	8.5	8.7	8.7	9.2	6.8	8.9
All SMSAs	6.9	7.3	7.9	6.8	7.6	7.6	7.3
All Non-SMSAs	6.0	6.4	8.0	8.2	6.6	7.3	7.2
U.S.	6.7	7.1	7.9	7.7	7.4	7.5	7.3

TABLE 3-36

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING MEDICAL COUNSELLING OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975[a]	1976[a]	1977	1978	1979	1980	1981
Northeast	11.4	14.2	20.1	17.5	24.0	24.9	25.7
North Central	13.0	15.1	21.5	21.2	23.2	20.3	19.2
South	11.0	11.7	18.5	17.1	20.7	22.8	20.1
West	15.0	14.1	22.8	23.0	21.5	25.1	29.9
All SMSAs	12.6	14.5	19.7	19.5	22.4	22.5	23.3
All Non-SMSAs	11.5	11.0	23.3	19.0	21.7	25.5	18.3
U.S.	12.3	13.6	20.6	19.4	22.2	23.2	22.9

[a]Diet counselling was subsumed in this category in the 1975-1976 surveys, but was specified separately in later years.

TABLE 3-37

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING DIET COUNSELLING OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1977	1978	1979	1980	1981
Northeast	8.4	8.3	7.1	10.1	9.7
North Central	6.0	6.5	6.5	8.6	6.6
South	6.1	7.7	6.0	8.2	7.6
West	7.2	7.1	3.9	6.6	6.8
All SMSAs	7.0	7.7	5.7	8.6	7.9
All Non-SMSAs	6.4	6.6	6.6	8.1	6.9
U.S.	6.9	7.4	6.0	8.5	7.6

TABLE 3-38

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING PHYSIOTHERAPY OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1975	1976	1977	1978	1979	1980	1981
Northeast	2.4	2.9	3.5	3.6	3.1	5.1	4.7
North Central	2.7	2.6	3.4	3.9	3.4	4.9	5.0
South	1.2	3.0	3.2	2.7	2.5	5.1	4.3
West	2.7	3.6	3.0	5.0	3.6	5.3	4.3
All SMSAs	2.2	3.3	3.8	4.0	3.3	5.5	5.0
All Non-SMSAs	2.4	2.3	1.7	1.6	2.4	3.8	3.1
U.S.	2.2	3.0	3.3	3.6	3.1	5.1	4.6

TABLE 3-39

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING PSYCHOTHERAPY/THERAPEUTIC LISTENING OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1974	1975	1976	1977	1978	1979	1980	1981
Northeast	5.5	5.6	5.0	6.8	6.9	5.4	6.1	6.4
North Central	3.5	4.5	4.8	4.0	3.6	3.0	4.0	3.2
South	4.7	3.2	2.7	5.8	4.3	4.7	4.6	4.4
West	3.9	3.5	4.5	4.8	5.8	4.6	5.6	5.9
All SMSAs	5.2	4.7	4.6	6.3	5.3	5.2	5.9	5.6
All Non-SMSAs	1.9	3.2	2.7	2.4	2.3	2.3	2.2	2.1
U.S.	4.4	4.3	4.1	5.4	5.0	4.4	5.0	4.8

TABLE 3-40

CHANGES IN PERCENT OF OFFICE VISITS INVOLVING FAMILY PLANNING SERVICES OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/NON-SMSAs

	1977	1978	1979	1980	1981
Northeast	1.3	1.5	1.7	1.8	2.2
North Central	1.4	1.6	1.9	2.8	2.2
South	1.6	1.3	1.2	1.7	1.6
West	1.6	1.4	0.9	3.0	1.8
All SMSAs	1.5	1.5	1.5	2.3	2.0
All Non-SMSAs	1.3	1.4	1.4	2.0	1.8
U.S.	1.5	1.4	1.4	2.2	1.9

4.0 CASEMIX

4.1 Importance of Adjusting for Casemix

What goes on in the physician's office will depend to a great extent on casemix: what symptoms patients present with, and how sick they are. In making intertemporal and cross-sectional comparisons, it is desirable to separate differences in visit content due to changing practice patterns from those involving casemix. Presumably the latter is less controllable at the physician level, at least in the short run. Rapid changes in casemix over time, or profound differences across region or specialty, are problematical for we are not sure whether we are observing "natural" (i.e., epidemiological) variation in resource use, technical or organizational change in the mode of physician practice, or economically motivated alterations in practice style (e.g., longer visits to fill growing downtime from extra competition). Clearly, each has very different policy implications. If physicians are spending more time with patients because they are older and sicker, then more physicians may be needed in the future, but if the extra time is going to treat the same kinds of patients, then society as a whole may question the marginal value of extra physician input. By adjusting for casemix, no matter how crudely, we will be in a position to make stronger statements on the forces behind the observed trends. First, however, we must determine whether physician casemix has actually been changing over time.

4.2 Trends in Diagnostic Casemix

Table 4-1 presents changes in the top twenty diagnostic clusters over the 1974-81 period for all physicians as a group.* These twenty clusters together account for nearly 60 percent of physicians' office visits; the other 40 percent are spread over the remaining seventy diagnostic clusters. According to the table, physicians' diagnostic mix has been changing somewhat over time. In particular, general medical exams (including not only routine physicals, but also well baby visits), while remaining the largest diagnostic category in every year, fell from 10.6 percent of visits in 1974 to 8.7 percent in 1981. Acute upper respiratory infections (URI), medical and surgical aftercare, and to a lesser extent, ischemic heart disease, also declined in relative frequency over the eight-year period. At the same time,

*See Chapter 2.4 for a description of the "cluster" approach to diagnostic mix.

TABLE 4-1

CASEMIX CHANGES OVER TIME FOR ALL SPECIALTIES

	1974	1975	1976	1977	1978	1979	1980	1981
1. General Medical Exam	10.6	9.5	9.4	9.3	8.7	8.2	8.9	8.7
2. Acute URI	7.5	7.3	7.5	7.5	6.9	6.3	5.9	5.9
3. Pre- and Postnatal Care	4.1	4.2	4.1	4.2	4.4	4.6	5.3	4.9
4. Hypertension	4.0	4.1	4.0	4.5	4.3	4.6	4.8	5.4
5. Nonpsychotic Depression, Anxiety, Neurosis	3.1	3.3	3.0	3.3	2.8	3.0	2.9	2.5
6. Lacerations, Contusions, Abrasions	2.7	2.4	2.5	2.6	2.7	2.6	2.3	2.3
7. Medical, Surgical Aftercare	5.0	4.7	5.0	3.4	1.8	1.7	2.2	2.3
8. Ischemic Heart Disease	2.9	2.8	2.7	2.6	2.5	1.7	1.8	1.7
9. Sprains and Strains	2.4	2.3	2.6	2.3	2.5	2.4	2.2	2.3
10. Acute Lower Respiratory	2.0	2.1	2.1	2.0	2.4	1.9	1.8	2.1
11. Otitis Media	1.5	1.7	1.8	2.0	2.3	2.3	2.5	2.6
12. Dermatitis and Eczema	1.7	2.0	2.0	2.0	2.3	1.3	1.4	1.3
13. Fractures, Dislocations	1.5	1.4	1.4	1.6	1.9	2.3	2.0	2.0
14. Chronic Rhinitis	1.9	1.6	1.8	2.2	2.1	1.9	1.6	1.6
15. Diabetes Mellitus	1.7	1.7	1.6	1.9	1.4	1.6	1.7	1.9
16. Degenerative Joint Disease	1.5	1.7	1.8	1.7	1.6	1.0	1.0	1.1
17. Refractive Errors	1.5	1.4	1.5	1.4	1.8	1.5	1.1	1.4
18. Acne	1.5	1.1	1.6	1.5	1.6	1.4	1.9	1.7
19. Urinary Tract Infection	1.3	1.5	1.3	1.2	1.3	1.4	1.2	1.2
20. Malignant Neoplasms	0.8	1.1	0.9	1.1	1.4	1.3	1.4	1.2

pre- and postnatal care, hypertension, and otitis media each came to represent a larger proportion of physicians' office visits. Hypertension, accounting for 4 percent of physicians' caseloads in 1974, for example, rose to 5.4 percent by 1981.

Changes in casemix can occur for a number of reasons. First, demographic shifts in the population over time can lead to a changing diagnostic mix. As the proportion of elderly in the U.S. population grows, for instance, we would expect chronic diseases, like hypertension or diabetes, to become relatively more frequent. Improvements in access may also affect diagnostic casemix over time; as insurance coverage for specific populations (e.g., the poor, the elderly) or for particular services (e.g., pre-natal care, preventive medicine) expands, the relative mix of diagnoses should reflect these trends. Still another reason is that the diseases themselves may be changing, in response to new therapies, lifestyle changes, etc. Heart disease is a good example of this: even after controlling for demographic changes in the population, mortality rates for heart disease have been falling steadily for the past twenty years (DHHS, 1981). And finally, diagnostic mix may appear to be changing because physicians are changing. If the various specialties diagnose patients differently because of their particular training, this could account for at least part of the observed trend.

Because it is possible that a patient's diagnosis is, in part, a function of the type of physician he or she first sees, we decided to look at casemix trends within specialty for primary care physicians only.* Breaking down casemix by specialty also allows us to compare casemix trends across the different specialty groups. Is the casemix of primary care specialists becoming less complex over time as they increasingly substitute for GPs, for instance? Even if specialists were taking GPs' sickest patients, we would still expect an overall dilution of average casemix severity. If so, then the content of specialists' office visits should also be growing less intensive over time. Evidence to the contrary could suggest that specialists' more intensive treatment of their patients is due not to their more severe casemix, as is commonly argued, but rather to their ancillary-intensive practice styles. Whether this is actually the case is, of course, an empirical question, though one which has important welfare implications for society.

*Sample sizes for the secondary specialists were often too small to yield robust casemix estimates.

Tables 4-2 through 4-7 present the top twenty diagnostic clusters for each of the primary care specialties: GPs, FPs , general surgeons, internists, OB-GYNs and pediatricians. The first fifteen diagnostic groups are the same for every specialty, while the remaining five clusters represent the most common diagnoses for that particular specialty. Almost without exception, the fifteen most frequent diagnoses for all physicians as a group were also the most frequent at the specialty level. Only for pediatricians and OB-GYNs was this not the case, largely because their caseloads are concentrated in many fewer clusters. To maintain consistency across the tables, however, all fifteen are shown.

Many of the trends observed in Table 4-1 (for all physicians) are even more pronounced for GPs alone (Table 4-2). Hypertension, for example, rises from 5.8 percent of the average GP's casemix in 1974 to 8.9 percent by 1981. The decline in general medical exams as a share of physician caseloads is also far more dramatic for GPs as a group: whereas 1 out of 10 patients were diagnosed as having general medical exams at the beginning of the time series, only 1 out of 15 did by 1981. This probably reflects the decreasing emphasis on annual physicals, as well as the substitution of pediatricians for well baby care (see our tracer analysis in Chapter 6). As far as the five diagnostic clusters are concerned, there were few stable time trends. Degenerative joint disease seems to account for a smaller proportion of visits over time, while obesity becomes relatively more important (except in 1981).

The single most common problem treated in general practitioners' offices in 1981 was acute URI (often simply the common cold). As we might expect, a substantial fraction of GPs' patients are visiting their physicians for routine (or preventive) care, such as general exams, or pre- and post-natal check-ups. Hypertension, diabetes and heart disease also account for a sizable proportion of GPs' caseloads (between 11-14%, depending on year).

Not surprisingly, FPs treat much the same types of patients as their colleagues in general practice (Table 4-3). A slightly larger proportion of FPs' practices is devoted to regular and preventive care; somewhat less to hypertension and acute URI. Most of the time trends in casemix are also very similar for the two specialties. It is interesting to note, however, that otitis media represents a growing proportion of FPs' casemixes over time but not of GPs'. This increase in the frequency of otitis media is also apparent for pediatricians (Table 4-7), who commonly treat this disease due to its high incidence in children.

TABLE 4-2

CASEMIX CHANGES OVER TIME FOR GENERAL PRACTITIONERS

	1974	1975	1976	1977	1978	1979	1980	1981
1. General Medical Exam	10.0	7.5	7.8	8.6	7.8	7.4	7.8	6.5
2. Acute URI	11.3	11.4	11.5	11.0	11.7	9.5	9.0	9.2
3. Pre- and Postnatal Care	2.8	2.5	2.6	3.2	2.2	2.3	3.0	2.5
4. Hypertension	5.8	6.0	6.0	7.0	6.9	8.2	8.7	8.9
5. Nonpsychotic Depression, Anxiety, Neurosis	2.3	2.4	2.5	2.5	2.1	2.0	2.1	1.8
6. Lacerations, Contusions, Abrasions	3.4	3.2	3.3	3.2	4.0	2.8	2.9	3.3
7. Medical, Surgical Aftercare	2.9	2.3	2.5	2.0	0.8	0.8	0.9	1.0
8. Ischemic Heart Disease	3.4	2.9	3.7	2.7	2.2	2.0	1.6	1.9
9. Sprains and Strains	3.2	3.0	3.8	3.3	3.7	3.6	3.3	2.6
10. Acute Lower Respiratory	2.7	3.1	3.2	3.0	3.7	2.7	2.6	3.7
11. Otitis Media	1.0	1.3	1.4	1.4	1.4	1.9	1.5	1.5
12. Dermatitis and Eczema	1.9	2.4	2.1	2.0	2.5	1.2	1.3	1.2
13. Fractures, Dislocations	1.1	1.1	1.0	1.3	1.1	1.4	1.1	1.2
14. Chronic Rhinitis	1.1	1.2	0.9	1.1	1.6	1.0	1.1	1.2
15. Diabetes Mellitus	2.2	2.5	2.3	2.4	2.1	2.6	2.7	3.0
16. Obesity	2.6	2.0	2.3	2.2	2.4	3.2	4.5	1.7
17. Degenerative Joint Disease	2.0	2.6	2.5	2.4	2.7	1.1	0.9	1.3
18. Urinary Tract Infection	1.6	2.0	1.8	1.7	1.6	2.1	1.4	2.0
19. Sinusitis Acute & Chronic	1.6	1.8	1.4	1.2	1.8	1.1	1.2	1.5
20. Peptic Diseases	1.3	1.3	1.2	1.1	1.3	1.5	1.5	1.9

TABLE 4-3

CASEMIX CHANGES OVER TIME FOR FAMILY PRACTITIONERS

	1974	1975	1976	1977	1978	1979	1980	1981
1. General Medical Exam	12.1	10.8	8.7	8.0	8.8	9.7	8.8	8.9
2. Acute URI	9.7	8.1	8.1	11.9	10.1	9.8	7.6	8.1
3. Pre- and Postnatal Care	3.3	3.3	4.3	2.7	3.9	3.7	8.8	4.0
4. Hypertension	4.6	6.2	5.8	5.7	5.8	5.6	5.8	8.3
5. Nonpsychotic Depression, Anxiety, Neurosis	2.3	2.7	3.3	3.3	1.9	1.8	2.4	2.0
6. Lacerations, Contusions, Abrasions	2.6	4.5	2.2	4.5	3.5	3.6	3.1	3.4
7. Medical, Surgical Aftercare	3.8	3.2	3.0	2.2	1.3	0.8	1.4	1.0
8. Ischemic Heart Disease	4.1	3.3	3.1	3.9	3.8	1.5	2.3	1.3
9. Sprains and Strains	2.9	2.6	2.0	2.6	3.7	2.3	2.4	3.3
10. Acute Lower Respiratory	3.0	1.9	2.3	2.2	3.7	3.0	3.0	3.5
11. Otitis Media	1.3	1.5	1.9	1.6	2.2	2.3	2.1	3.1
12. Dermatitis and Eczema	1.4	1.8	2.3	2.3	2.1	1.2	1.5	1.2
13. Fractures, Dislocations	1.6	1.3	1.0	1.1	1.5	1.1	1.4	1.1
14. Chronic Rhinitis	0.7	0.8	2.2	1.7	0.9	0.5	1.2	1.7
15. Diabetes Mellitus	2.8	2.0	3.6	3.3	2.3	2.4	2.2	2.6
16. Obesity	2.4	2.6	4.5	1.1	1.5	3.5	0.8	0.8
17. Urinary Tract Infection	0.8	1.7	2.3	1.4	1.7	1.6	2.0	1.6
18. Degenerative Joint Disease	2.2	1.9	1.8	2.4	1.0	1.0	1.0	1.2
19. Low Back Pain Disease and Syndromes	1.5	1.0	1.1	1.0	1.2	1.4	1.9	1.6
20. Peptic Diseases	1.6	1.3	1.1	1.0	1.4	1.7	1.5	1.5

Medical/surgical aftercare, which had accounted for about one sixth (16.4%) of general surgeons' office practice in 1974, was more than halved over the eight year time series (Table 4-4). The increase in the supply of surgical specialists (recall Table 3-3) may have led to diminished in-hospital surgical activity. General surgeons may have offset this to some degree with an increase in primary care activities; note the relative rise in office visits for acute URI, for example. There has been some increase in surgical-related diagnoses, however, e.g., malignant neoplasms and hernias.

Hypertension patients are accounting for a greater fraction of internists' office visits every year (see Table 4-5). Whereas one out of ten visits to internists had a primary diagnosis of hypertension in 1974, one out of seven did by 1981. This may reflect both a higher prevalence of hypertension (due to the aging population) and more frequent visits for hypertension (due to improved access), as well as the substitution of internists for GPs in the care of hypertension patients. By contrast, ischemic heart disease has been falling as a proportion of internists' office visits over time (from 9.1% of their caseloads in 1974 to 5.3% in 1981). This strong trend is apparently the driving force behind the decline observed for the sample as a whole, since the frequency of ischemic heart disease in cardiologists' offices (the only other specialty treating a large number of heart disease patients) has been relatively constant over the 1974-81 period (NAMCS data, not shown). We will explore the changing treatment of both hypertension and chronic ischemic heart disease in more detail in Chapter 6.

As mentioned above, pediatricians and OB-GYNs have the bulk of their visits concentrated in a few diagnostic clusters (Tables 4-6 and 4-7). For OB-GYNs, general exams (15%), pre- and post-natal care (41%), medical and surgical aftercare (4%), vaginitis (6%), and menstrual disorders (4%) were the most frequent diagnoses. For pediatricians, the top clusters include general medical exams (about 29% of the visits in 1981, mostly well baby visits), acute URI (18%), otitis media (14%), and acute lower respiratory infections (4%).

The most dramatic shift in OB-GYN caseloads is the 21 percent increase in pre- and post-natal visits, from 34 percent of all visits in 1974 to 41 percent in 1981. Again, this presumably reflects demographic shifts (rising birth rates), improved access (leading to more visits per pregnancy), and substitution of OB-GYNs for GPs. The only other trends in OB-GYNs' diagnostic casemix were a small decline in vaginitis and menstrual disorders as a percent of office visits, and a slight increase in contraception visits (from 1.8% to 3.3% of visits).

TABLE 4-4

CASEMIX CHANGES OVER TIME FOR GENERAL SURGEONS

	1974	1975	1976	1977	1978	1979	1980	1981
1. General Medical Exam	6.7	6.3	7.3	7.0	4.8	4.4	2.6	3.6
2. Acute URI	3.2	3.5	2.7	4.9	3.3	4.3	3.4	4.6
3. Pre- and Postnatal Care	0.8	0.5	0.7	0.4	0.5	0.4	0.2	0.4
4. Hypertension	2.9	3.0	2.6	3.1	2.2	3.4	1.3	3.7
5. Nonpsychotic Depression, Anxiety, Neurosis	0.9	1.2	0.5	0.9	0.7	0.6	0.6	1.1
6. Lacerations, Contusions, Abrasions	5.8	4.4	4.7	6.4	5.7	5.6	5.9	4.8
7. Medical, Surgical Aftercare	16.4	16.9	18.6	12.4	7.5	5.0	6.3	7.1
8. Ischemic Heart Disease	1.4	0.8	0.5	1.1	0.9	0.3	0.5	0.7
9. Sprains and Strains	2.7	2.2	2.3	2.7	2.3	1.9	1.8	3.3
10. Acute Lower Respiratory	0.7	1.2	0.6	0.8	0.6	1.1	0.9	1.2
11. Otitis Media	0.2	0.6	0.3	0.1	0.4	0.4	0.4	0.2
12. Dermatitis and Eczema	0.6	0.9	0.8	0.8	0.8	0.7	0.3	0.5
13. Fractures, Dislocations	2.2	1.6	2.0	1.6	2.1	1.4	3.4	1.5
14. Chronic Rhinitis	0.3	0.3	0.2	0.2	0.4	0.0	0.4	0.1
15. Diabetes Mellitus	1.1	0.8	0.4	1.0	1.1	0.6	0.5	0.8
16. Malignant Neoplasms	2.8	2.6	3.3	3.2	5.3	4.9	4.9	4.3
17. Benign and Unspecified Neoplasm	2.9	3.5	3.2	4.7	4.0	3.6	4.7	3.2
18. External Abdominal Hernias	2.1	2.4	2.2	2.7	3.9	4.0	4.4	4.3
19. Hemorrhoids and Other Conditions	2.6	1.7	2.0	2.5	3.2	3.0	3.1	3.1
20. Acne	2.3	1.7	1.8	2.1	3.1	2.2	2.5	2.2

TABLE 4-5

CASEMIX CHANGES OVER TIME FOR INTERNAL MEDICINE

	1974	1975	1976	1977	1978	1979	1980	1981
1. General Medical Exam	6.9	6.1	5.1	5.7	5.8	4.5	5.7	5.9
2. Acute URI	4.4	4.8	4.5	4.8	4.6	4.3	4.4	3.2
3. Pre- and Postnatal Care	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.3
4. Hypertension	9.5	9.6	10.3	11.8	12.3	11.6	12.7	14.8
5. Nonpsychotic Depression, Anxiety, Neurosis	3.8	3.2	3.4	3.0	3.0	2.8	2.9	2.1
6. Lacerations, Contusions, Abrasions	1.3	1.1	0.9	1.0	1.2	1.4	0.8	1.0
7. Medical, Surgical Aftercare	1.5	1.7	1.5	1.4	0.7	0.5	1.0	1.0
8. Ischemic Heart Disease	9.1	9.3	8.7	8.7	8.3	5.3	6.2	5.3
9. Sprains and Strains	2.0	1.6	1.6	1.4	1.8	1.6	1.2	1.5
10. Acute Lower Respiratory	2.4	2.3	3.0	2.2	2.8	2.7	2.1	2.2
11. Otitis Media	0.2	0.6	0.2	0.3	0.3	0.4	0.4	0.5
12. Dermatitis and Eczema	1.1	1.2	0.9	1.0	1.3	0.6	0.7	0.3
13. Fractures, Dislocations	0.2	0.6	0.2	0.3	0.4	0.3	0.4	0.5
14. Chronic Rhinitis	0.7	1.3	1.5	0.9	1.1	2.3	2.6	0.7
15. Diabetes Mellitus	4.4	4.6	4.5	4.7	4.4	4.4	4.5	5.3
16. Malignant Neoplasms	2.0	3.4	3.0	2.2	3.0	4.2	4.8	2.1
17. Degenerative Joint Disease	2.3	2.8	3.7	3.5	3.0	2.2	2.2	2.6
18. Peptic Diseases	1.7	1.6	1.8	1.9	1.8	2.3	1.7	2.1
19. Rheumatoid Disease	0.9	1.7	2.1	1.3	1.5	1.8	2.0	2.4
20. Obesity	2.2	1.6	1.5	1.4	0.9	1.3	1.5	1.0

TABLE 4-6

CASEMIX CHANGES OVER TIME FOR OBSTETRICIANS-GYNECOLOGISTS

	1974	1975	1976	1977	1978	1979	1980	1981
1. General Medical Exam	21.0	18.4	18.8	16.4	14.9	14.6	14.8	15.3
2. Acute URI	0.7	0.5	1.4	0.6	0.5	0.3	0.3	0.5
3. Pre- and Postnatal Care	34.1	36.0	35.5	34.1	36.1	39.8	42.1	41.2
4. Hypertension	0.5	0.7	0.7	0.6	0.6	0.3	1.2	0.8
5. Nonpsychotic Depression, Anxiety, Neurosis	0.6	0.7	0.5	0.6	0.3	0.3	0.4	0.2
6. Lacerations, Contusions, Abrasions	0.4	0.2	0.2	0.1	0.2	0.2	0.3	0.1
7. Medical, Surgical Aftercare	5.4	5.5	5.8	4.8	3.0	3.1	3.7	4.1
8. Ischemic Heart Disease	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
9. Sprains and Strains	0.2	0.1	0.3	0.1	0.1	0.1	0.3	0.3
10. Acute Lower Respiratory	0.2	0.2	0.1	0.1	0.2	0.0	0.1	0.0
11. Otitis Media	0.1	0.2	0.1	0.0	0.1	0.0	0.0	0.0
12. Dermatitis and Eczema	0.1	0.2	0.2	0.2	0.1	0.0	0.0	0.2
13. Fractures, Dislocations	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0
14. Chronic Rhinitis	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0
15. Diabetes Mellitus	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.2
16. Vagnitis/Vulvitis/ Cervicitis	7.8	8.1	6.9	7.9	6.7	7.7	6.0	5.6
17. Menstrual Disorders	4.3	4.2	4.8	5.3	5.3	3.8	2.9	3.6
18. Contraception	1.8	2.0	2.2	2.8	3.8	3.1	3.3	3.3
19. Benign & Unspecified Neoplasms	2.1	2.5	2.2	2.6	2.5	1.2	1.0	1.3
20. Menopausal Symptoms	1.7	1.8	1.7	2.7	1.7	1.5	1.1	1.3

TABLE 4-7

CASEMIX CHANGES OVER TIME FOR PEDIATRICIANS

	1974	1975	1976	1977	1978	1979	1980	1981
1. General Medical Exam	33.8	32.0	28.6	29.6	27.4	26.7	28.7	28.8
2. Acute URI	18.5	17.9	19.3	18.3	17.0	16.4	17.3	17.9
3. Pre- and Postnatal Care	0.0	0.2	0.4	0.1	0.2	0.1	0.3	0.3
4. Hypertension	0.1	0.0	0.2	0.1	0.1	0.2	0.0	0.1
5. Nonpsychotic Depression, Anxiety, Neurosis	0.6	0.7	0.6	0.5	0.5	0.6	0.1	0.4
6. Lacerations, Contusions, Abrasions	2.4	2.6	2.1	2.2	2.1	2.1	2.3	1.8
7. Medical, Surgical Aftercare	2.6	1.8	2.3	1.0	0.7	0.6	1.1	1.1
8. Ischemic Heart Disease	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9. Sprains and Strains	0.3	0.5	0.7	0.4	0.4	0.5	0.5	0.4
10. Acute Lower Respiratory	5.3	5.6	4.4	4.9	5.2	3.5	4.1	3.9
11. Otitis Media	8.2	8.1	8.8	9.3	11.0	12.0	11.3	13.8
12. Dermatitis and Eczema	2.2	3.7	2.4	3.2	3.7	1.8	1.7	2.1
13. Fractures, Dislocations	0.3	0.6	0.7	0.4	0.3	0.4	0.4	0.3
14. Chronic Rhinitis	1.7	2.6	3.5	4.3	2.5	4.2	3.4	2.4
15. Diabetes Mellitus	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1
16. Asthma	1.3	1.5	2.8	2.9	2.7	3.8	3.0	2.4
17. Infectious Diarrhea	3.0	1.7	3.5	1.8	2.5	0.4	0.4	0.5
18. Nonfungal Infections of Skin	1.5	1.6	0.8	1.3	1.2	1.5	1.4	1.4
19. Conjunctivitis/Keratitis	0.5	0.6	0.7	0.9	0.5	0.9	0.7	0.7
20. Urinary Tract Infection	0.6	0.7	0.6	0.5	0.8	0.7	0.6	0.7

Like other primary care physicians, pediatricians are devoting a smaller share of their office visits to general medical exams over time. Otitis media, by contrast, is becoming relatively more prevalent: whereas 8.2 percent of pediatricians' visits had a primary diagnosis of otitis media in 1974, almost 14 percent did by 1981. As pointed out earlier, this large increase may be due to a number of factors -- increased access to care for children (especially the Medicaid poor); a relative decline in other disease categories; heightened incidence of the infection; and/or an increase in the share of these office visits provided by pediatricians (recall Table 3-4).

4.3 Development of A Casemix Index

Diagnostic casemix apparently has been changing over the 1974-81 period, both within and across specialty groups. In this section, we develop a casemix index which will allow us to hold this changing casemix constant in analyzing trends in physicians' practice patterns over time.

4.3.1 Previous Work

Epidemiologists usually adjust for casemix differences along age-sex (and possibly racial) strata using either direct or indirect standardization (see Monson, 1980, pp. 76ff, for examples). Direct methods weight age-sex outcome cells by national age-sex proportions while indirect methods take the opposite approach of weighting sample age-sex proportions by national outcome rates, thereby giving an "expected" outcome rate for the age-sex distribution of the particular sample. The latter approach is generally preferred either because (a) cell-specific outcome rates are unavailable, or (b) the frequencies are so small (e.g., two males under 5 years old) that sample specific rates are unstable. Both methods become arduous, however, when more than a few strata are simultaneously considered. A physician's casemix, both in diversity and severity, will vary by more than age and sex. Symptoms, underlying disease, and the physican's familiarity with the patient are all important contributors to the time and resources needed to diagnose and treat cases.

To more completely adjust for the multi-dimensional nature of a physician's casemix, a regression format was used as an indirect standardization method. The technique described below has already been employed by Mathe-

matica (1981) in their evaluation of the National Health Service Corps.* The basic approach involves regressing length of visit on sets of patient and diagnostic variables, then using the estimated coefficients in a second stage as an indirect way of weighting casemix proportions in each physician's practice. Associating complexity with physician (or hospital) inputs using regression analysis is similar in effect, if not approach, to the CRVS hernia equivalent method used by Hughes *et al*. (1972) in evaluating surgical procedures, and to Fetter *et al*.'s approach (1980) in developing hospital Diagnostic Related Groups (DRGs).** Moreover, our ultimate concern with future physician requirements reinforces our focus on patient-physician contact minutes as the preferred weighting scheme.

Casemix indices generated in this manner *imply that complexity is proportional to patient time spent with the physician.* This may be true in general, but certainly not always, as we show later. Other weighting techniques are possible, including fatality rates (see Hornbrook and Goldfarb, 1981) or charges, both of which may be more reflective of severity. One other possibility available to us from the NAMCS data was the reported seriousness of the problem, but the four-part classification did not seem detailed enough to effectively discriminate according to severity. Fully 80 percent of visits were considered slightly serious or non-serious, while only 3.6 percent were "very serious" (NCHS, 1978, p. 21).

4.3.2 Initial Estimation

The NAMC Surveys provide a wealth of detail on visit casemix, including age, sex, and race of patient, whether the presenting problem was new or old, the actual reason for visit (in the patient's words), as well as the physician's own diagnosis. As literally hundreds of diagnostic classifications are possible, we selected the top 60 diagnostic clusters

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*For an example using a regression approach in epidemiology, see Holford, White, and Kelsey, 1978.

**DRG construction involves "recursively subdividing the observations, through binary splits, into subgroups based on values of variables [like ICDA, age, sex] that maximize variance reduction or minimize the predictive error of the dependent variable [i.e., length of stay]." Fetter, *et al*. (1980, p. 6). Our regression approach differs in that (a) not all interactions are explored (nor are they necessary), (b) ICDA codes were selected based on diagnostic frequency with a large residual category, (c) patient reasons-for-visit were added to diagnoses, and (d) specific procedures--like surgery--were consciously excluded to avoid biasing casemix complexity towards specialties that treat patients in a particular way.

identified by Schneeweiss et al. (1983), treating the remaining diagnoses as a residual group. (See Section 2.4 above for details.)

Two RFV classes were chosen to supplement the diagnoses:

- (RFV-EXAM) examinations, including pregnancy, well baby, gynecological, eye, and general medical (about 14% of visits overall); and

- (RFV-FUTRT) follow-up care after surgery and for medication or medical counselling (about 7% of visits).

These classes include several, related RFVs that occurred frequently and had appeared as separate RFVs in the top 45-50 RFVs. They follow closely two of the seven modules used by NCHS to categorize RFVs; namely, diagnosis and preventive, screening, and treatment. RFV-EXAM focuses on patient-initiated visits of an asymptomatic nature, and is similar in concept to the non-illness care descriptor used by Mathematica (1981). RFV-FUTRT primarily includes patients returning for care that have already been treated initially. While post-surgical treatment should be more time intensive, medication visits tend to be much shorter than average, and the effect of this variable on length of visit is ambiguous. (For further discussion on how visit initiation could be fit into an RFV scheme, see HER, 1982, pp. 64-69.)

Two additional visit descriptors were also included:

- (NEWPT) new problem of a new (to the physician) patient (15% of visits); and

- (NEWPROB) new problem of an old patient (25% of visits),

to capture the extra time that may be necessary for the physician to acquaint himself with the patient, his/her medical history and relevant family background, or the new problem that has emerged. Both should add to visit length based on Mathematica's (1981) findings.

The percent of a physician's visits female (FEMALE), black (BLACK), and under 14 years of age (AGELT14), 25-44 (AGE25-44), 45-64 (AGE45-64), and greater than 65 (AGEGT65) were included to supplement the RFV and diagnostic information. Both NEWPT and NEWPROB percentages were interacted with the age, sex, and race percentages to test for the possibility that blacks, females, and elderly patients have more serious (e.g., longer) visits either as new patients or old patients presenting new problems.

In contrast to Mathematica (1981), we chose not to include physician characteristics in our index work. Adding physician characteristics, while

certainly improving the equation's explanatory power as we show later, would result in a confounding of casemix differences with other, irrelevant demand and supply phenomena (e.g., oversupply of surgeons), possibly leading to longer visits for the same casemix.*

Using the 1977 NAMCS data, aggregated to the physician level, linear OLS length of visit (LOV) regressions were run on these variables, specified as a proportion of a physician's visits.** Insignificant variables with t-values less than one were dropped and the equation rerun, providing the final set of index weights. The results are presented in Table 4-8 along with the variable means. Coefficients can be interpreted as weighted averages of visit lengths for particular categories. For example, a new, male patient, aged less than 14, visiting the physician for a sprained ankle would thus have an expected visit length of 16.31 minutes (= 20.92 + 7.67 - 16.97 - 8.37 + 13.06). In general, if condition X or age-group Y significantly adds to visit length, we conclude that it is responsible for a more complex casemix.

Even without specialty, the equation explains 47 percent of the variation in length of visit, around a mean of 15.1 minutes.*** Holding diagnosis and other factors constant, all patients, both young and old, have significantly longer visits than the reference group, patients aged 14-24. Being a new patient adds another 20.92 minutes to the average visit, although for every age group except those over 65, this result is tempered by a large negative coefficient on the age-new patient interaction terms (e.g., NEWPT*A14), indicating a much smaller, new patient effect (ranging between 10.37 and 15.72 minutes). Patients seeing their regular physician for a new problem (NEWPROB) do not seem to require any more time than patients returning with old problems (in the intercept), holding other factors constant.

While no difference was found in LOV between males and females (a result consistent with Mathematica's on a narrower sample), race did have some impact on LOV, at least for new patients. Although black patients generally spent the same amount of time with the physician as white patients, black patients

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*Mathematica (1981) recognized this problem and used constant means for physician age and sex when actually constructing their index.

**In a very few cases physicians reported zero contact minutes with the patient--probably 1-2 visits simply for medication. Mathematica (1981, p. 61) found no major differences when zero-LOV visits were excluded.

***The explanatory power for Mathematica's "private sector," or NAMCS-based, equation was 0.14, far lower than ours even though we excluded specialty and other physician characteristics. Our sample is far more heterogeneous, however, and includes such outliers as psychiatrists. Excluding psychiatrists, our R^2 falls to 0.24.

TABLE 4-8

REGRESSION RESULTS FROM CASEMIX GENERATING EQUATION USING 1977 NAMCS DATA

	Regressions		
Variables	(1)	(2)[a]	Means
LOV	--	--	15.094
FEMALE	2.08	--	.606
BLACK	2.15	--	.070
AGELT14	8.89**	7.67***	.171
AGE25-44	9.29**	6.00**	.257
AGE45-64	7.74**	7.93***	.250
AGEGT65	10.80***	5.62***	.162
NEWPT	33.87***	20.92***	.153
NEWPROB	4.71	--	.249
RFV-EXAM	1.90	1.31	.144
RFV-FUTRT	-9.87***	-9.91***	.067
DX-EXAM	-6.48***	-5.27***	.093
URI	-16.54***	-15.67***	.075
PRENATAL	-10.90***	-8.79***	.042
HYPER	-1.95	--	.045
DEPRESS	24.91***	25.74***	.033
ABRASION	-16.92***	-16.13***	.026
AFTERCARE	-8.34***	-7.90***	.034
IHD	-1.14	--	.026
SPRAINS	-10.35***	-8.37**	.023
LRESP	-8.36**	-8.04**	.020
OTITMED	-17.02***	-17.61***	.020
ECZEMA	-22.05***	-22.33***	.020
FRACTURE	-4.80	-4.29	.016
RHINITIS	-5.06*	-5.24**	.022
DIABETES	-15.83***	-14.37***	.019
JOINTDIS	-13.70**	-9.94*	.017
REFRACT	-3.12	--	.014
ACNE	-3.96	--	.014
UTI	-10.86*	-8.85	.012
MALIGNEO	-5.29	-4.53	.011
VAGINIT	-2.17	--	.013
OBESITY	-4.15	-2.96	.012
NEOPLSBEN	-3.60	--	.010
BURSITIS	2.57	--	.010
DIARRHEA	-15.75**	-12.29*	.011
SKINFECT	-22.05**	-22.88***	.008
BACKPAIN	0.99	--	.008
SINUS	-13.24**	-14.15**	.009

TABLE 4-8 CONT.

REGRESSION RESULTS FROM CASEMIX GENERATING EQUATION USING 1977 NAMCS DATA

	Regressions		
Variables	(1)	(2)[a]	Means
PEPTIC	-5.60	--	.008
ASTHMA	12.71**	13.15***	.009
MENSTR	-0.99	--	.008
CATARACT	0.60	--	.006
FIBROS	3.41	--	.008
HEADACHE	6.84	--	.006
SCHIZ	21.25***	20.88***	.006
CONJUNCT	-14.35	-17.44**	.006
WARTS	-32.66***	-33.68***	.006
PROSTAT	-19.85***	-20.49***	.006
HEMRHOID	4.37	--	.005
CONTRACEP	-2.42	--	.004
MENOPAUS	-13.59*	-11.04	.007
THYROID	3.50	--	.005
SEXDIS	-4.00	--	.005
NEURITIS	4.91	--	.006
PERSDIS	41.77***	42.18***	.005
VIRALEXAN	-23.33*	-20.03	.004
VERTIGO	-10.36	--	.005
GLAUCOMA	-5.53	--	.003
IRONDEF	7.03	--	.005
CEREBRO	4.80	--	.004
RHEUMAT	-11.65	-10.32	.004
OTITEXTERN	-9.30	--	.004
SKINKERA	-0.32	--	.003
CARDIAC	19.08**	18.82**	.004
EMPHYSEMA	15.61	18.01*	.003
CHOLE	-10.78	-16.67	.003
EARWAX	-4.93	--	.004
HERNIA	-13.12	--	.003
BRCYST	-2.74	--	.003
SKMALNEO	-0.68	--	.003
NEWPT*BL	-14.76**	-7.85*	.012
NEWPROB*BL	-1.05	--	.018
NEWPT*FEM	-8.93	-4.03	.091
NEWPROB*FEM	0.63	--	.149
NEWPT*A14	-26.23**	-16.97**	.024
NEWPROB*A14	-2.96	--	.059
NEWPT*A25-44	-23.38*	-11.20	.043
NEWPROB*A25-44	-10.40	--	.057

TABLE 4-8 CONT.

REGRESSION RESULTS FROM CASEMIX GENERATING EQUATION USING 1977 NAMCS DATA

Variables	Regressions (1)	(2)[a]	Means
NEWPT*A45-64	-26.13**	-18.48*	.037
NEWPROB*A45-64	3.88	--	.056
NEWPT*A65	-15.71	--	.022
NEWPROB*A65	-14.67	-1.38	.036
Constant	10.27***	13.06***	1.000
	$R^2(c)=0.47$	$R^2(c)=0.47$	
	F(84,1580) = 19.16***	F(48,1618) = 34.93***	

***Significant at one percent level.
**Significant at five percent level.
*Significant at ten percent level.

[a]Equation (1) re-estimated after all variables with t-values less than one were dropped.

visiting the physician for the first time (NEWPT*BL) had visits almost 8 minutes shorter on average than a patient with the typical casemix, age, and problem mix. This finding would seem to suggest more limited access for black patients seeking out a new physician, though small sample sizes for new, black patients (only 1.2% of the sample, or 600 visits) and the tremendous sampling variability of the NAMCS cast some doubt as to the validity of this result.* At the very least, this question may warrant further attention in the future.

In instances where the physician reported a diagnostic exam (about 9.3% of visits), visits were 5.3 minutes shorter. Note also, that this variable tended to dominate the patient's perception that he came in for an exam (RFV-EXAM was insignificant). When the patient says he is returning for follow-up care, visits were even briefer, 9.9 minutes on average.

Because psychiatrists' visits, which tend to be close to an hour long, were included in the sample, most of the diagnostic coefficients are negative. One can still distinguish between more and less complex diagnoses based on the size and significance of the coefficients, however. Positive, or insignificant coefficients will indicate greater casemix complexity, while significant, negative coefficients are associated with shorter visits, and hence, less complexity. The diagnostic clusters associated with a simpler casemix included:

acute URI	(-15.67)
prenatal visits	(-8.79)
abrasions	(-16.13)
medical and surgical aftercare	(-7.90)
sprains and strains	(-8.37)
lower respiratory infections	(-8.04)
otitis media	(-17.61)
eczema	(-22.33)
rhinitis	(-5.24)
diabetes	(-14.37)
joint disorders	(-9.94)
diarrhea	(-12.29)
skin infections	(-22.88)
sinusitis	(-14.15)
conjuctivitis	(-17.44)
warts	(-33.68)
prostatitis	(-20.49)

*It should also be noted that in our first year report, when 1976 data were used to estimate the casemix index, we found just the opposite result -- new, non-white patients had significatly longer visits than the average patient. Although our earlier specification had a broader definition of nonwhite than that used here (it included blacks, Asians, etc.), and a slightly different set of diagnoses, the fact that these findings are so very different suggests that this particular result should be viewed with caution.

Those raising visit complexity include:

depression	(25.74)
asthma	(13.15)
schizophrenia	(20.88)
personality disorders	(42.18)
cardiac arrhythmia	(18.82)
emphysema	(18.01)

Many of the longer visits were associated with psychological problems seen primarily by psychiatrists. Earlier work with the 1976 survey showed that many of these diagnoses remain statistically significant when psychiatrists are excluded from the sample, e.g., neuroses, personality disorders and situation disturbances (Cromwell et al., 1982). With psychiatrists included, neuroses accounted for 2 percent of office visits in 1976; without them, the percentage fell to 1.1 percent, implying that at least some non-psychiatrists "treat" mental disorders. By comparison, schizophrenia visits fell from 0.3 percent to 0.03 percent, or one visit in ten thousand for non-psychiatrists.

4.3.3 Derivation of the Casemix Index

Using equation (2) in Table 4-8, a casemix index (I) was derived for every physician in the sample for all years using the following formula:

$$(3) \quad I_{it} \equiv \hat{I}_{it} \big/ \hat{I}_{74}$$

where

$$\hat{I}_{it} = 13.06 + \sum_{j=1}^{45} \hat{a}_j^{77} \cdot (\%X)_{jit}$$

$$\hat{I}_{74} = 13.06 + \sum_{j=1}^{45} \hat{a}_j^{77} \cdot (\%\bar{X})_j^{74}$$

and $\hat{I}_{it}$ = predicted LOV for the i-th physician in year t; $\hat{I}_{74}$ = predicted national LOV in 1974 (used to deflate all physicians for all years); $\hat{a}_j^{77}$ = estimated LOV coefficient for the j-th predictor, taken from column (2), Table 4-8; $(\%X)_{jit}$ = percent of visits of the j-th characteristic (e.g., blacks) for the i-th physician in year t; and $(\%X)_j^{74}$ = national average percent of visits of the j-th type in 1974. Applying constant coefficients to the j characteristics results in a casemix-adjusted LOV that

is both cross-sectionally and intertemporally comparable. Then deflating by the 1974 weighted index provides a natural scaling of LOV, giving a pure casemix index.

Note that the index will be more sensitive to changes in casemix that involve significantly longer or shorter visits--like eczema, neuroses and cardiac arrythmias. Unless a major epidemic or disaster befalls a certain part of the country, our expectations should be for a relatively stable index over time, or across large regions at any point in time. Major differences across specialties would remain, however, as specialty is not explicitly controlled for in the predicting equation.

4.4. Trends in the Casemix Index

Tables 4-9 and 4-10 display mean casemix indices, first by region and SMSA/non-SMSA, then by specialty, over the 1974-1981 period. All indices are based on the entire NAMCS sample of visits, aggregated to the physician level and then weighted as before. Each number in the table represents relative deviation from the 1974 LOV-weighted casemix index.

Before proceeding, it should be noted that two one-time changes in the Reason-For-Visit (RFV) classification and diagnostic coding schemes, respectively, may cause some discontinuities in the casemix index. As discussed in Chapter 2, the NAMC survey adopted a new, more detailed RFV classification in 1977 which was not directly comparable with that used earlier. Although the two classification schemes were made as consistent as possible, some discrepancies were inevitable. To the extent that the two RFV categories used in casemix index construction (exams and follow-up treatment) are affected, this change will be reflected in the index. A similar change in diagnostic coding systems occurred in 1978, when NAMCS switched from ICDA-8 to ICD-9. This coding change, and the resulting incomparabilities, will have even greater implications for our casemix index due to the large number of diagnostic clusters included.

There is one additional caveat regarding the casemix index. Theoretically, the value of an index should equal one in the base year. In the last line of Table 4-9, however, we see that our 1974 casemix index is not equal to one, but rather 1.04. The reason for this discrepancy is simple: the mean of a sum is not equal to the sum of the means when a variable is not perfectly normally distributed. In this instance, the numerator of the index ($\hat{I}_{it}$) is calculated as the mean of the sum for each physician, while the denominator ($\hat{I}_{74}$) is calculated as the sum of the means across physicians. As a result,

TABLE 4-9

CHANGES IN CASEMIX INDEX OVER TIME: GEOGRAPHIC REGIONS AND SMSAs/non-SMSAs

	1974	1975	1976	1977	1978	1979	1980	1981
Northeast	1.08	1.09	1.06	1.10	1.09	1.12	1.11	1.13
North Central	0.99	0.97	0.97	0.98	0.98	1.02	1.00	0.99
South	1.04	0.98	0.98	1.03	1.02	1.06	1.05	1.05
West	1.05	1.04	1.02	1.04	1.07	1.11	1.11	1.11
All SMSAs	1.06	1.05	1.03	1.06	1.07	1.11	1.09	1.09
All Non-SMSAs	0.95	0.91	0.92	0.94	0.94	0.99	0.99	0.99
U.S.	1.04	1.02	1.00	1.04	1.03	1.08	1.06	1.06

TABLE 4-10

CHANGES IN CASEMIX INDEX BY SPECIALTY OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	0.92	0.96	0.96	0.90	0.94	0.96	0.98	0.96
GPs	0.92	0.92	0.92	0.93	0.91	0.98	0.99	0.97
General Surgeons	0.98	0.87	0.86	0.93	0.94	0.95	0.94	0.96
Internists	1.18	1.18	1.19	1.19	1.18	1.18	1.20	1.20
OB-GYNs	0.94	0.90	0.89	0.95	0.94	0.95	0.90	0.90
Pediatricians	0.81	0.68	0.70	0.79	0.81	0.82	0.82	0.81
Allergists	1.10	1.23	1.21	0.95	0.99	1.25	1.09	1.01
Cardiologists	1.26	1.38	1.32	1.37	1.43	1.36	1.41	1.35
Dermatologists	0.86	0.88	0.85	0.96	0.87	0.93	0.91	0.92
Other medical specialists[a]	1.32	1.42	1.42	1.31	1.31	1.47	1.42	1.50
Ophthalmologists	1.27	1.27	1.24	1.26	1.27	1.30	1.27	1.25
Orthopedic Surgeons	1.06	0.99	0.93	1.01	1.07	1.05	1.04	1.04
Otolaryngologists	0.96	0.98	0.98	0.96	0.87	0.95	0.93	0.96
Urologists	0.97	0.96	0.96	0.97	0.93	1.04	0.97	1.00
Other surgical specialists	1.77	0.94	0.84	1.07	1.04	1.03	1.04	0.99
Psychiatrists	2.93	2.98	2.96	2.94	3.01	2.90	2.96	2.96
Other	1.13	0.97	1.18	1.09	1.11	1.04	1.01	1.16
All	1.04	1.02	1.00	1.04	1.03	1.08	1.06	1.06

[a]Includes neurologists

the 1974 casemix index is not identically equal to one. With this in mind, we proceed to the descriptive results.

Looking as the U.S. as a whole, there seems to be little consistent trend in diagnostic casemix over time. Although there is an abrupt increase in the casemix index between 1978 and 1979, this is also the same time that NAMCS switched from the ICDA-8 diagnostic coding system to ICD-9 (denoted in the tables with a dashed line), suggesting that this result is probably attributable to the coding change rather than to a real increase in casemix complexity. This constancy of diagnostic casemix is also apparent within geographic regions, and in urban and rural areas.

There are some marked differences in casemix severity across geographic areas, however. Physicians practicing in SMSAs do appear to have more complicated casemixes on average than their rural counterparts (by roughly 10%), at least when it comes to time spent with patients. The Northeast also appears to have the most physician-intensive casemix, a full 10 points higher, for example, than the North Central region which was the lowest. Diagnostic casemix is also slightly more complex in the West.

As seen in Table 4-10, there are wide variations in casemix across specialties as expected. Psychiatrists have by far the most time-intensive casemix, nearly 3 times the national average. Other medical specialists (including neurologists) and cardiologists form a second group with average casemixes roughly 30-40 percent more complicated than the U.S. as a whole, followed by allergists, internists, and ophthalmologists.

Pediatricians, by contrast, had the simplest casemix as measured by contact minutes: only four-fifths the national average. Other physicians with demonstrably simpler casemixes include dermatologists, OB-GYNs and general surgeons. Simpler-than-expected casemixes for general surgeons is due, in part, to a focus on office, rather than total, visits which ignores hospital surgical time. It may also be due to the fact that general surgeons are devoting some portion of their office practices to general practice, an hypothesis we explore explicitly in Chapter 5. As for general and family practitioners, their casemix complexity is somewhat below the national average, but above that of all of their primary care colleagues except internists. It is also interesting to note that three of the surgical specialties, otolaryngology, urology and orthopedic surgery, have below average office casemixes.

Small sample sizes make it difficult to see stable trends in casemix within specialty, especially for the medical specialists. Even for the six primary care specialties at the top of the table, there are no consistent trends in casemix in either direction. One reason we may not be able to detect any time trends is because of discontinuities in the index arising from the coding changes described above. To test the possibility that a statistically significant time trend in casemix does exist, we regressed the casemix index on time, including a dummy variable for the 1979 diagnostic coding change. In two subsequent regressions we added first the specialty dummies and then specialty and geographic location to our time trend to see whether our cross-sectional findings achieved statistical significance, other things constant.

Multivariate analysis confirmed our finding of no time trends in casemix, whether or not the additional variables were included. Not surprisingly, the dummy variable marking the switch to ICD-9 was highly significant, with a coefficient of 0.036. Specialty differences reported earlier were confirmed without exception, as were the geographic results.

Although we find no stable trends in the casemix index over time, these results are not necessarily inconsistent with the casemix shifts observed in section 4.2. In section 4.2, we were concerned with absolute changes in diagnostic mix, e.g., how has the relative frequency of various diagnostic clusters changed over time? The casemix index goes a step further, essentially capturing changes in casemix complexity (as proxied by visit length) given these shifts in diagnostic casemix. Thus, while the relative mix of diagnoses has been changing over the 1974-81 period, the overall complexity of these diagnoses does not appear to have changed in any systematic way.

5.0 MULTIVARIATE ANALYSIS OF TIME TRENDS IN OFFICE VISIT CONTENT

5.1 Objectives

Chapter 3 presented descriptive time trend data for all of the dimensions of office visit content: length of visit, diagnostic and therapeutic services. Many of these dimensions were indeed changing over time; the average office visit appeared to be somewhat longer and more service-intensive than it used to be. Often these time trends were particularly marked in certain parts of the country or among certain specialties. Our descriptive analysis has two major limitations, however: (1) we have not determined the statistical significance of the trends; and (2) we have not held other variables constant, such as casemix. The regression analysis presented in this chapter deals with both of these problems.

There are a number of potentially offsetting effects that must be considered in analyzing time trends in office visit content. First of all, we know that specialists account for a growing share of all office visits. Since many specialists tend to have longer visits relative to GPs and use more services per visit, then we would expect increases in visit intensity over time <u>for this reason alone</u>. However, at the same time, the <u>average</u> visit should be growing less complex as these specialists increasingly substitute for GPs in providing (routine) primary care.* This would tend to offset, or at least attenuate, any intensity increases resulting from increased specialization.

Productivity shifts also may alter office visit content. If aides increasingly substitute for physician time, this should have a <u>downward</u> effect on visit lengths. (Our measure of visit length captures only physician time.) On the other hand, aides can also provide ancillary services directly and the need to fully utilize such inputs may encourage physicians to order the marginal lab test or x-ray. Thus, service intensity may rise even though physician contact time is falling; the net impact on visit content will depend on the relative sizes of these shifts.

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*This would not have to be the case if the patient population was growing sicker over time or if the demand for office visits increased for any other reason, say improved access. There is no evidence that this is taking place, however.

Office visit content may change due to the changing sexual composition of physician supply. Women physicians are projected to grow as a percent of the stock from 8.0 percent in 1974 to 16.4 percent by 1990 (BHP, 1980). Previous work suggests that women physicians spend more time with their patients, compared with men physicians (Langwell, 1982; Mitchell, 1982), but little is known of the nature of these longer visits. Low patient demand may leave women physicians with considerable down-time in the office which is spent in longer visits. Alternatively, women physicians may be providing a higher quality, service-intensive product.

Finally, a shift in MD-DO composition of the total physician pool over time may also have offsetting effects on changes in visit content. Osteopathic visit lengths may be longer, on the one hand, but less service intensive, on the other. Although DOs represent only 4 percent of the physician stock, they are expected to grow slightly by 1990: to 5 percent of all physicians (<u>The DO</u>, 1981). More important, however, is the fact that almost all DOs (91.6%) are involved in primary care (GPs, internists, OB-GYNS, and pediatricians), compared with only 52.7 percent of MDs (recall Table 3-3). Assuming no shifts in specialty mix, then DOs as a percent of all primary care physicians will increase from 6.75 to 8.38 percent.*

In this chapter we use multiple regression analysis to test the statistical significance of the observed time trends in office visit content. This is done in two steps. The first is a simple linear test of the time trend alone, using our time series cross-section of physicians. Here, trend estimates would be an amalgam of offsetting changes in health status or casemix, specialization and movements to group practice, in addition to pure visit intensity changes. In the second stage, casemix, specialty, region, and practice mode are held constant, essentially testing the impact of time on visit content over-and-above these other changes.

The chapter begins with an empirical specification and discussion of estimation techniques. Following that are the regression results, subdivided into visit length, diagnostic services and therapeutic services. Finally, we summarize our multivariate results, drawing some implications for future trends in office visit content in the U.S.

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*For example (0.916*0.04)/[0.916*0.04)+(0.527*0.96)] = 0.0675, primary care DOs/ All primary care physicians, 1980.

5.2 Empirical Specification and Estimation

A reduced-form equation for office visit content can be specified as follows:

$$OVC = f(TIME;\ CASEMIX;\ PROD;\ MDCHAR;\ LOC)$$

where OVC	=	dimension of office visit content,
TIME	=	time,
CASEMIX	=	casemix index,
PROD	=	physician productivity,
MDCHAR	=	physician age, sex and specialty; also whether physician is board-certified;
LOC	=	geographic location.

Means for all variables are presented in Tables 5-1 and 5-2.

5.2.1 Dependent Variables

A total of twelve dimensions (variables) of office visit content were analyzed. The first dependent variable, average length of office visit (LOV), was specified in minutes, while the remaining variables were expressed as the percent of a physician's office visits in which a given service (or services) were ordered or provided. These include the percent of visits involving: (1) a general examination/history (GEXAM); (2) a limited examination/history (LEXAM); (3) laboratory tests (LAB); (4) x-rays (XRAY); (5) electrocardiograms (ECG); (6) vision tests; (7) Pap tests (PAP); (8) office surgery (OFFSURG); (9) counselling (COUNSEL)*; (10) family planning (FAMPL); and (11) physiotherapy (PHYSIO). With the exception of physician age (to be discussed later), each equation has an identical specification.

As can be seen from this list, not all ancillary services were tested. Endoscopies were omitted because of the large concentration of zeroes. Drugs were also excluded because of the inconsistencies in question specification across the years.

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*A visit was defined to include counselling of some sort, if any <u>one</u> of the counselling services (including psychotherapy) was provided.

TABLE 5-1

MEANS FOR LENGTH OF VISIT AND ANCILLARY SERVICE REGRESSIONS, 1974-1981

	Total	Primary Care	Medical Specialists	Surgical Specialists	Psychiatrists
LOV	15.10	13.68	15.83	15.26	44.92
GEXAM[a]	17.77	20.74	13.22	12.53	--
LEXAM[a]	58.69	59.37	56.19	63.40	--
LAB	22.09	27.77	15.28	10.14	--
XRAY	7.76	6.82	5.99	12.03	--
ECG[a]	3.23	3.77	7.41	0.60	--
PAP[b]	4.91	7.24	0.51	0.47	--
COUNSEL	26.24	26.53	22.00	18.29	93.42
OFFSURG[a]	7.46	4.50	17.53	13.56	--
VISION[a]	5.38	1.67	0.69	19.18	--
FAMPL[b]	1.71	2.49	0.11	0.24	--
PHYSIO[a]	2.68	2.01	6.08	5.38	--
TIME	4.29	4.24	4.49	4.31	4.34
CASEMIX	1.05	0.98	1.09	1.02	2.95
FP	0.09	0.13	--	--	--
IM	0.12	0.18	--	--	--
OB-GYN	0.09	0.14	--	--	--
PED	0.10	0.16	--	--	--
GS	0.06	--	--	--	--
ALL	0.01	--	0.17	--	--
CARD	0.01	--	0.16	--	--
DERM	0.04	--	0.48	--	--
OTHMED	0.01	--	--	--	--
OPH	0.05	--	--	0.24	--
ORS	0.05	--	--	0.20	--
OTO	0.03	--	--	0.12	--
URO	0.02	--	--	0.08	--
OTHSURG	0.02	--	--	0.07	--
PSYCH	0.03	--	--	--	--
OTHERMD	0.01	--	--	--	--
GPGSPEC	0.04	0.05	--	--	--
IMSPEC	0.03	0.04	--	--	--
PEDSPEC	0.01	0.12	--	--	--
SECIM	0.02	--	0.30	--	--
SECGS	0.02	--	--	0.08	--
RURAL	0.25	0.30	0.09	0.21	0.05
SOLO	0.57	0.57	0.63	0.53	0.85
BOARD	0.45	0.31	0.75	0.76	0.56
FEMALE	0.03	0.04	0.04	0.01	0.08
MDAGE	49.69	50.03	48.24	49.10	49.18
MDAGESQ	2581.36	2614.55	2443.64	2523.50	2521.66
NE	0.23	0.22	0.29	0.23	0.35
SOUTH	0.32	0.33	0.28	0.34	0.29
WEST	0.20	0.19	0.22	0.21	0.21

[a]Refers to 1975-1981.
[b]Refers to 1977-1981.

TABLE 5-2

MEANS FOR LENGTH OF VISIT REGRESSIONS, PRIMARY CARE PHYSICIANS, 1974-1981

	GP	FP	Internists	OB-GYNs	Pedia- tricians	General Surgeons
LOV	12.54	11.90	18.90	13.46	12.06	13.67
TIME	3.77	5.03	4.38	4.41	4.49	4.07
CASEMIX	0.96	0.98	1.20	0.93	0.79	0.92
GPGSPEC	0.10	0.04	--	--	--	0.13
IMSPEC	--	--	0.22	--	--	--
PEDSPEC	--	--	--	--	0.08	--
SOLO	0.74	0.49	0.52	0.42	0.41	0.60
BOARD	0.01	--	0.50	0.74	0.75	0.61
FEMALE	0.03	0.01	0.03	0.04	0.10	0.01
MDAGE	53.63	46.44	48.88	47.96	47.29	51.64
MDAGESQ	2995.01	2229.47	2491.56	2395.02	2327.82	2768.36
NE	0.17	0.13	0.31	0.26	0.30	0.24
SOUTH	0.35	0.35	0.27	0.32	0.31	0.33
WEST	0.21	0.17	0.19	0.19	0.16	0.18
RURAL	0.41	0.44	0.16	0.17	0.17	0.29

5.2.2 Independent Variables

Time

Our time trend is the major analytic variable of interest for this project. It is numbered consecutively one through eight beginning in 1974. Because we run two sets of regressions, first regressing each dimension of office visit on time alone, then adding in other confounding factors like specialty, casemix, etc., our two TIME coefficients will have very different interpretations. In the first instance, the coefficient provides a gross estimate of the time trends in visit content, representing an amalgam of shifts in specialty mix, casemix, productivity, geographic supply and demand conditions, and a changing physician population, as well as any true changes in visit content. In the second instance, when each of these factors is held constant explicitly, the TIME coefficient can be interpreted as a "pure" change in content due solely to changing physician behavior in the office. In other words, when we control for changing specialty mix and casemix, it's as if we were looking at a single physician over time and asking how he or she has altered the content of an office visit.

Casemix

Since more complicated cases should generally require longer and more service-intensive visits, it is critical that we adjust for casemix differences across visits and across time. To do so, we employed a casemix index based on expected length of visit and standardized to a base of 1.0. The original equation used to generate expected visit lengths is described in detail in Chapter 4. Our index (CASEMIX) captures variations in patient demographics (age, sex, race), visit status (old vs. new patient), and diagnoses that are associated with longer (and presumably more complicated) visits. For length of visit and the majority of ancillary services, therefore, we would expect a positive relationship between casemix and service intensity. There may be a few services, like office surgery and limited exams, which have the opposite relationship with casemix, i.e., as casemix worsens these services may be performed with <u>less</u> rather than greater frequency. In the case of office surgery, for example, we would expect more complicated cases to be referred to the hospital. Similarly, as complexity increases, physicians should be more prone to perform a general exam than a limited one.

Productivity

No measures of physician productivity or input use are available from the NAMC surveys, but we do know whether the physician practices alone or in a group with other physicians. Because of the economies of scale involved, group physicians are more likely to use aides in their production of office visits, either as substitutes for their own time or as complementary inputs, making the solo/group distinction a reasonable proxy. SOLO is set equal to one if the physician is in solo practice, and zero otherwise.

Specialty

In order to capture variations in visit content as a function of physician training, we specify 15 dummy variables for specialty, with GPs as the omitted category. For all physicians except FPs specialty was self-reported. Because the NAMC survey did not distinguish between general and family practitioners, FPs were identified using our board-certification variable. Thus, if a general practitioner was board-certified in family practice, he was designated as an FP. The main drawback of this approach is that our board-certification variable had to be set equal to zero for all FPs (or the matrix inversion required for regression analysis will not work). The implications of this problem are discussed more fully in the board-certification section below.

The inclusion of specialty dummies allows us to capture cross-specialty differences in ancillary utilization or visit length, though it will not tell us anything about time trends in office visit content <u>within</u> specialty, or for particular specialty groups. To address this latter issue, we partitioned the physician sample into subsets, estimating separate equations for each of the following specialty groups: 1) <u>primary care physicians</u>: family practitioners (FP), internists (IM), OB-GYNs, and pediatricians (PED), with GPs as the omitted category; (2) <u>medical subspecialists</u>: allergists (ALL), cardiologists (CARD), dermatologists (DERM), and other medical specialists (OTHMED, the omitted group); (3) <u>surgical subspecialists</u>: ophthalmologists (OPHTHAL), orthopedic surgeons (ORS), otolaryngologists (OTO), urologists (UROL), other surgical specialists (OTHSURG) and general surgeons (GS, in the intercept); and (4) <u>psychiatrists</u> (PSYCH).* In addition, specialty-specific regressions were estimated for each of the primary care specialties (plus general

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*In preliminary work, we also included cross-product terms to capture interactions between time and other explantory variables, especially specialty. Because of persistent problems wth multi-collinearity, all interaction terms were eventually dropped and are not included in the regressions presented here.

surgeons), though only the length of visit regressions will be presented here.*

As the U.S. physician population becomes increasingly specialized, policymakers have expressed a growing concern over a possible shortage of primary care practitioners. Yet anecdotal evidence suggests that as their ranks swell, specialists are beginning to provide more primary care (Rosenberg, 1975). This is especially true of general surgeons, who have increasingly assumed many primary care functions (Owens, 1974). To account for the possibility that the visit content of general surgeons and general/family practitioners are in some cases indistinguishable, we constructed a dummy variable equal to one if a general surgeon reports general practice as his secondary specialty, and zero otherwise (GPGSPEC). Included in this variable are also GPs and FPs who cite general surgery as their secondary specialty, as the two are expected to be very similar.

GPs and general surgeons are not the only specialties who may have nearly identical practice styles. Because of their training, internists and the medical subspecialists may have similar patients whom they treat in much the same way. An internist may choose to concentrate in a particular area, say cardiology, yet still identify himself first and foremost as an internist. To capture this "super-internist," we set IMSPEC equal to one if an internist indicates a medical subspecialty as his secondary specialty, and zero otherwise. At the same time, medical subspecialists may either choose, or be forced (through competition) to provide some general internal medicine. Although this group should theoretically be very similar to our "super-internists," we specify a separate dummy variable for them, SECIM.

It's also possible that surgical subspecialists are compelled to do some general surgery as their numbers increase and competition heightens. To account for this possibility, SURGGS is set equal to one if a surgical subspecialist reports general surgery as his secondary specialty, and zero otherwise.

The last specialty dummy included in this analysis is PEDSPEC, which takes on the value one if a pediatrician has a secondary specialty in allergy or cardiology. These "super-pediatricians" should have a much more intensive practice style than other pediatricians.

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*Results of the specialty-specific service regressions are obtainable from the authors. The time trend results from these equations are summarized in Table 5-17, however.

Physician Characteristics

The age of a physician, his sex, and whether or not he is board-certified should also affect the content of an office visit. Because the relationship between physician age and visit content will depend on the nature of the service being provided, we tested three alternative functional forms for every dimension of visit content. A linear (MDAGE), quadratic (MDAGE, MDAGESQ) or discrete (UNDER40, OVER60) form was chosen based on the best fit of the data.

Previous work has shown that women physicians see fewer patients per hour than their male counterparts, a finding which has been largely attributed to their lower productivity (Kehrer, 1976; Langwell, 1982; Mitchell, 1982). All of the studies addressing this issue were characterized by two important data limitations, however. First, none of the data bases contained explicit information on physician-patient contact minutes; rather, visits lengths had to be imputed from total weekly visits and hours worked per week. To the extent that female physicians experienced greater downtime, this would be reflected as an upward bias in their apparent visit lengths. A second problem concerns a lack of data detailing what actually happened during an office visit. Although visit lengths of women physicians appeared to be longer, there was no way of determining whether women were providing a substantively different product than their male peers, say, doing more comprehensive exams or performing more lab tests, or whether they were simply less productive. A major advantage of the NAMCS data base is that we can test these hypotheses directly; physician-patient contact time is reported at the individual visit level, plus we can determine what services were provided. In this effort, FEMALE is set equal to one if the physician is female, and zero otherwise.

It is commonly argued that board-certified physicians charge higher fees because they provide a higher quality office visit than other physicians, spending more time with patients and ordering more ancillaries. Yet it is also possible that because of their additional training (and presumably higher skills), board-certified physicians may require less time to diagnose and treat patients. Although we cannot tell *a priori* which effect will dominate, we include a board-certification dummy (BOARD) to capture any differences associated with this credential which may exist. It should be noted that our BOARD coefficient will be somewhat underestimated because of our exclusion of board-certified FPs. (Recall that the board-certification variable was set equal to zero for all FPs since they were defined on this specialty board. Failure to do so would result in perfect multicollinearity between BOARD and FP, precluding matrix inversion.)

As hypothesized earlier, whether a physician is an MD or a DO should also affect visit length and intensity. Although we are able to identify the osteopaths in our sample, we were unable to obtain data on the characteristics of these physicians, like age, sex and board certification. As a result, DOs are excluded from most of our regression work. (Fortunately DOs provide only about 6% of office visits.) Because we are still interested in DOs, however, we estimate a limited set of regressions (on the complete physician sample only), which include osteopaths but have no other physician descriptors (except specialty). In these regressions, DO is set equal to 1 if the physician is an osteopath, and zero otherwise.

Geographic Location

Finally, we include four variables for the location of the physician's practice: whether in the Northeast (NE), SOUTH, or WEST (North Central physicians are in the intercept); also, whether the physician lives in a non-SMSA (RURAL). These location variables will help capture differences in demand and supply characteristics (income, physician scarcity, etc.) that may influence what happens during an office visit.

5.2.3 Estimation Methods

All of the equations were estimated in linear form using ordinary least squares. For length of visit and a number of the diagnostic and therapeutic services (e.g., general and limited exams, counselling), OLS is the appropriate estimation method, yielding unbiased and efficient parameter estimates. For some of the other services, though, which have a large concentration of zeroes (e.g., ECGs, x-rays), OLS estimates may be biased downwards, but even more importantly, traditional tests of significance do not apply (Pindyck and Rubinfeld, 1981). Rather, t-statistics will be underestimated, implying a possible failure to find a significant time trend when one really exists. In these instances, Tobit analysis is the preferred regression technique. Unfortunately, our attempts to employ Tobit to date have been thwarted by the enormity of the data set (close to 13,000 observations) and the large number of independent variables, constraining us to OLS. (We hope to resolve these difficulties and re-estimate the equations for the final report.) The fact that we do find significant time trends for so many of our dependent variables suggests that OLS is capable of answering our primary research question -- whether or not

there have been significant changes in office visit content over time -- but may be incapable of accurately quantifying such changes.

Most equations were estimated on a sample of 1,000-2,000 physicians over the eight-year period 1974-1981, for a total sample of 12,815. If a service category had not been included in a survey year, or was incomparable with other years, that year was dropped and the equation estimated on a slightly smaller sample size. Actual sample sizes are presented for each regression in the results sections that follow.

Independent variables were stepped into each regression in two steps, beginning with TIME alone, then with all the remaining variables. This first regression enables us to determine the total impact of time on office content, before adjusting for any other changes. From the second regression we obtain the net time trend, holding confounding factors constant.

5.3 Regression Results for Changes in Visit Content: Length of Visit

Five LOV regression equations are shown in Table 5-3. Equation (1) presents estimates of average visit length for all physicians, while equations (2)-(5) explain visit length for four subsets: primary care physicians, medical subspecialists, surgical subspecialists, and psychiatrists, respectively. The first row of the table presents the parameter estimate for TIME when it is the only explanatory variable included in the equation. The remaining rows provide final parameter estimates when all variables are included; this TIME trend (row 2) can be interpreted as the marginal impact of time on visit content (minutes per year), after all other factors have been accounted for, including shifts in casemix, specialty mix, and productivity. R^2s at the bottom of the table refer only to the equation with all the variables included.

Our coefficient of determination for the total physician sample (column 1) of 0.52 indicates that we've successfully explained over half the variation in office visit lengths over time. A substantial amount of this variation is apparently attributable to specialty alone, for when we go to the physician subset equations in columns (2) through (5), our R^2s drop dramatically to 0.15-0.28, depending on specialty group.

Consistent with our descriptive results, the gross time trend in office visit length is positive and significant, confirming that physicians are spending more time with their patients every year. More specifically, the TIME coefficient in the first row of Table 5-3 implies that the average office visit in the U.S. is increasing at a rate of almost 8 seconds per year (0.13 * 60 = 7.8 seconds), or about a full minute over the 1974-1981 period. Although

TABLE 5-3

REGRESSION RESULTS FOR LENGTH OF OFFICE VISIT OVER TIME, 1974-1981

	TOTAL (1)	PRIMARY CARE (2)	MEDICAL SPECIALISTS (3)	SURGICAL SPECIALISTS (4)	PSYCHIATRISTS (5)
TIME	0.130***	0.144***	-0.227*	0.102**	-0.321*
TIME	0.023	0.064**	-0.242**	0.049	-0.340**
CASEMIX	7.00***	6.00***	8.55***	4.21***	11.68***
FP	0.01	-0.10	--	--	--
IM	4.67***	4.64***	--	--	--
OB-GYN	1.20***	0.78***	--	--	--
PED	0.71***	0.16	--	--	--
GS	1.54***	--	--	--	--
ALL	-0.82	--	-9.07***	--	--
CARD	6.32***	--	-2.28***	--	--
DERM	-0.38	--	-7.86***	--	--
OTHMED	8.60***	--	--	--	--
OPH	3.57***	--	--	3.04***	--
ORS	1.75***	--	--	0.93***	--
OTO	1.14***	--	--	-0.19	--
URO	3.49***	--	--	2.39***	--
OTHSURG	3.93***	--	--	2.85***	--
PSYCH	17.98***	--	--	--	--
OTHERMD	1.95***	--	--	--	--
GPGSPEC	-0.69**	-0.67**	--	--	--
IMSPEC	0.11	0.16	--	--	--
PEDSPEC	-0.13	-0.06	--	--	--
SECIM	-0.65	--	-0.44	--	--
SECGS	-0.41	--	--	-0.33	--
SOLO	0.36***	-0.03	-0.10	1.28***	4.32***
BOARD	0.13	0.50***	-0.28	-0.35	-1.25
FEMALE	2.22***	1.98***	2.69**	1.32	4.98***
MDAGE	-0.34***	-0.30***	-0.23	-0.48***	-0.27
MDAGESQ	0.0040***	0.0036***	0.0027	0.0054***	0.0026
NE	1.16***	0.96***	1.90***	1.52***	2.02*
SOUTH	1.19***	1.18***	0.83	1.24***	4.00***
WEST	1.86***	1.78***	0.45	2.63***	3.50***
RURAL	-1.17***	-1.20***	-2.10***	-0.89***	-3.71**
Constant	11.34***	11.35***	17.29***	17.66***	12.97
R^2(c)	0.52	0.27	0.38	0.15	0.23
F(df)	(33,12999) =449.45***	(19,6916) =145.8***	(16,1047) =43.83***	(18,3765) =40.56***	(12,1053) =30.53***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

this may not seem like a large increase, when multiplied by every visit in the United States (there were 585.2 million office visits provided in 1981 alone), it translates into an additional 1.27 million physician hours per year -- a not insignificant number.* If the average physician worked 60 hours per week, in other words, 21,167 more physician FTEs would be needed to fill this requirement.

Once we hold other factors, like specialty and casemix, constant, the time trend, while still positive, is no longer statistically significant--at least not for all physicians as a group (see row 2, column 1). The fact that TIME becomes insignificant when these other variables are incorporated into the regression suggests that the gross time trend observed in row 1 is more a function of specialty shifts or a changing physician population than of a pure increase in visit lengths.

Turning to the various specialty groups, we see that primary care physicians are providing longer visits every year, by 8.6 seconds on average (0.144 * 60 = 8.6). This figure is more than halved when confounding factors are held constant (to 3.8 seconds/year), but remains highly significant. Offsetting this increase is a dramatic decline in the visit lengths of medical subspecialists, who are spending 14.5 seconds less time per patient, on average, each year. Multiply this figure by seven years (1981-1974) and we find that visits to medical specialists were almost two minutes shorter in 1981 than they were in 1974. Those shorter visits cannot be explained by a reallocation of visits to primary care activities, because we have held casemix constant. Psychiatrists, too, are providing significantly shorter visits (by about 20 seconds/year; see eq. 5), though their visits are so long to begin with that the relative change is not nearly as great.

It is actually quite surprising that the decline in visit lengths of medical subspecialists and psychiatrists is able to offset the positive time trends in primary care by enough that the net time trend for all physicians becomes insignificant. Apparently, the coefficients on TIME for these two groups are <u>so large</u> (0.242 and 0.340 for medical subspecialists and psychiatrists, respectively) that they overcome the fact that these physician specialties together provide only 26.9 percent of all office visits, compared with 65.7 percent for primary care physicians.

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*For example, (7.8 seconds * 585.2 million visits) = 4565 million seconds = 1.27 million hours.

Not surprisingly, our casemix measure is an extremely good predictor of visit length. A more complicated visit mix, as measured by higher CASEMIX scores, increases the average amount of time the physician spends with the patient. Physicians with an unusually complex casemix (say 1 S.D. above the mean) will spend about three minutes longer per visit than physicians with an "average" casemix.

As expected, a great deal of the variation in visit length is attributable to physician specialty. Nearly all specialists had significantly longer visits than GPs; only FPs, allergists and dermatologists had comparable visit lengths. Physicians providing the longest visits include psychiatrists (naturally), cardiologists, internists, other medical and surgical specialists, ophthalmologists and urologists. OB-GYNs, pediatricians, general surgeons, orthopedic surgeons and otoloryngologists have somewhat shorter visits, but still spend more time with patients than GPs, as evidenced by their smaller, but still positive, coefficients. These differences cannot be due to a more complicated visit mix since our CASEMIX measure is holding this constant. Instead, they probably reflect differences in practice styles; by virtue of their training, internists, cardiologists, and other medical specialists, for example, emphasize cognitive skills, such as lengthy histories and physical examinations (recall Table 3-7), rather than procedural skills.

General surgeons spend about a minute and one-half more with their patients than GPs. Those providing some primary care (GPGSPEC) spend slightly less time, but still have significantly longer visits than GPs, by 0.85 minutes, on average (1.54 - 0.69 = 0.85) None of the other physicians practicing outside their primary specialty differed from their colleagues in any significant way, at least regarding visit length.

The fact that solo physicians have significantly longer visits than those in group practice suggests that the latter may be able to improve their productivity by substituting aide time for own time. Though there were no differences for primary care physicians or medical subspecialists, surgical subspecialists and psychiatrists do realize substantial productivity gains to group practice, "saving" 1.3 and 4.3 minutes, respectively, on each visit. We know that group practice is becoming more popular among physicians; in fact, 45 percent of all visits in 1981 were made to group physicians, up from 40 percent in 1974. Our SOLO coefficient implies that the decline of the solo practitioner over time will have a restraining influence on increases in visit length resulting from other factors (such as specialization), hence reducing physician requirements, but raising auxiliary staff needed.

It is commonly argued that board-certified physicians provide a higher quality visit than their non-board-certified peers, spending more time with patients and ordering more ancillaries. Yet if board-certified physicians are better trained, they may also be able to diagnose and treat patients more quickly, suggesting shorter visits. At least for primary care physicians, the former effect appears to dominate: board-certified physicians spend a half-minute longer per patient than their non-board-certified colleagues.* Whether they provide more ancillary services as well is a question we explore in the following sections.

As seen in Table 5-3, female physicians do spend significantly more time with their patients (about 2.2 minutes more on average), even after specialty and other physician characteristics are held constant. (Whether they are providing more ancillaries during these longer visits remains to be seen, of course.) This finding is consistent across specialty groups as well, with the exception of the surgical subspecialists, which include very few women to begin with. (Less than 1% of visits to surgical subspecialists were provided by women.) Particularly striking is the difference in visit lengths of male and female psychiatrists of nearly five full minutes.

The relationship between physician age and visit length is U-shaped; that is, visit lengths of younger physicians start out quite long, decline as the physician enters his prime (early forties), and then start to rise again as the physician ages. This is exactly what we would expect, for as young physicians just starting their careers begin to build up a private practice, they have fewer patients, and hence, more time to spend with each. Another explanation may be that younger physicians need more time to diagnose illnesses than do their more experienced colleagues. At the other end of the spectrum, older physicians should also spend longer with patients as obsolescing skills reduces the demand for their services. We might also expect older physicians to spend more time per visit to the extent that they are treating patients they have known, and cared for, for many years. Only for medical specialists and psychiatrists is there no relationship between physician age and length of office visit, suggesting that the market facing these physicians may be somewhat different, and perhaps less competitive, than that facing their peers.

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*The reader should recall that this figure is probably an underestimate since board-certified FPs are not included in our BOARD variable (see section 5.2.2).

Lengths of visit are significantly different across the country, suggesting that demand and supply variables not included in this analysis do play an important role. As noted in our descriptive results, visit lengths are longest in the West, followed by the Northeast and Southern parts of the country, and shortest in the North Central region (the omitted category). Visits are also significantly shorter in non-SMSAs, presumably because lower physician-population ratios in these areas place greater time demands on physicians who do live there. When the sample is subset into specialty groups, similar results are found for primary care practitioners and surgical specialists. Medical specialists again provide relatively longer visits in the Northeast, but the other regional differences disappear for this group. The urban/rural disparity is especially large for medical specialists: urban physicians spend over 2 minutes longer with their patients, on average, than their rural colleagues, who are in shorter supply. Finally, we see that Southern psychiatrists provide the longest visits of all psychiatrists, spending even longer with patients than their peers in the Northeast (two minutes more). One explanation for this anomalous result is less ambulatory demand for psychiatric care in the South, possibly because of a social stigma towards mental health care or because of poor insurance coverage for psychiatric treatment. (Clearly, the two are related.)

Thus far, we have determined that the reason that lengths of visit have not been increasing over the 1974-1981 period for all physicians, once specialty shifts are held constant, is because of offsetting trends in primary care (positive time trend) and in the medical subspecialties and psychiatry (negative time trend). Although we cannot do specialty-specific analysis of the medical subspecialists with any confidence (because of sampling variability and small sample sizes), we can, and did, decompose the trend in primary care to see which specialties were responsible for the observed increase in length of visit.

Table 5-4 presents length of visit regressions for each of the five primary care specialties separately plus general surgery. Although general surgeons are not included in our primary care equations, we include them here because: a) they provide a significant share of office visits, about 6-7%, and b) we know from the multivariate work above that a number of general surgeons are providing some amount of primary care, possibly substituting for GPs.

As seen in Table 5-4, the observed increase in visit lengths for primary care practitioners as a whole is largely attributable to the growing visit

TABLE 5-4

REGRESSION RESULTS FOR LENGTH OF OFFICE VISIT BY PRIMARY CARE SPECIALTY, 1974-1981

	GP (6)	FP (7)	IM (8)	OB-GYN (9)	PEDS (10)	GS (11)
TIME	0.216***	0.388***	0.121*	0.096	-0.048	0.193***
TIME	0.037	0.340***	0.026	0.097	-0.134**	0.171***
CASEMIX	5.46***	4.60***	8.87***	8.26***	4.11***	2.83***
GPGSPEC	-0.86***	-0.30	--	--	--	-0.78*
IMSPEC	--	--	-0.24	--	--	--
PEDSPEC	--	--	--	--	0.00	--
SOLO	-0.28	-0.40	0.18	0.42	0.34	0.69**
BOARD	2.05*	--	1.85***	-0.36	-1.10***	-0.26
FEMALE	2.36***	2.47*	2.03**	0.89	1.83***	0.30
MDAGE	-0.11*	-0.53***	-0.35***	-0.55***	-0.21*	-0.33***
MDAGESQ	0.0021***	0.0061***	0.0043***	0.0058***	0.0026**	0.0036***
NE	0.58*	1.40**	1.77***	0.60	0.79**	1.31***
SOUTH	1.04***	0.75*	3.00***	0.12	0.75**	1.35***
WEST	1.80***	2.36***	1.49***	0.75*	2.06***	3.27***
RURAL	-0.93***	-1.15***	-2.66***	-1.52***	-0.60	-0.95***
Constant	6.84***	16.28***	12.35***	18.08***	13.03***	16.19***
R^2(c)	0.15	0.15	0.13	0.12	0.09	0.10
F(df)	(13,2124) =33.04***	(12,656) =11.60***	(13,1844) =24.41***	(12,1229) =15.67***	(13,1019) =9.03***	(13,1300) =13.68***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

lengths of family practitioners. More specifically, FPs are spending 0.34 minutes, or 20.4 seconds, more with patients each year. Summing over time, we find that visits provided by FPs were over two minutes longer in 1981 than they were in 1974, *ceteris paribus*. Visit lengths of GPs, by contrast, have not changed at all between 1974 and 1981.

Why are FPs spending more and more time with patients? One explanation may be that they are increasing their use of ancillary services, and/or doing more counselling, two hypotheses we explore directly in Sections 5.4 and 5.5. Another possibility is that FPs themselves are changing over time; as more residency-trained family practitioners enter the specialty in the latter part of the time-series, we would expect FPs' visits to become longer and more service intensive (as they do).

In contrast to their colleagues in family practice, pediatricians are actually spending significantly *less* time with office patients each year, about 8 seconds less per visit on average. One explanation may be an increase in office surgery over time (recall Table 3-16), since the type of office surgery performed by pediatricians is fairly simple (e.g., removing sutures), and should require comparatively little time.

The only other specialty showing any significant time trend in length of visit is general surgery. General surgeons are lengthening their office visits by about 10 seconds per year, or more than a minute over the eight year period, *ceteris paribus*. The explanation cannot be a shift to more time-consuming primary care, since we are already holding casemix constant. Moreover, our coefficient on GPGSPEC is negative (-0.78), implying shorter visits for general surgeons doing primary care. Perhaps the following section on ancillary utilization will shed some light on the question.

Although board-certification was associated with longer visits for primary care physicians as a group, this result does not hold for all primary care specialties individually. Board-certified pediatricians actually have significantly *shorter* visits than their non-board-certified counterparts, while there are no differences in visit length associated with board-certification for either OB-GYNs or general surgeons. Apparently, board-certified GPs* and internists are solely responsible for this primary

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*Since FPs are specifically excluded from the GP sample, who are these board-certified GPs? They are usually board-certified surgeons or anesthesiologists who report general practice as their primary specialty. One explanation is that these physicians have withdrawn from a more demanding hospital-oriented practice and now engage in general practice in a state of semi-retirement.

care finding, spending about two minutes longer with each patient than their less credentialled colleagues.

Consistent with our previous findings, female physicians in the primary care specialties spend anywhere from 1.8-2.5 minutes longer with patients than male physicians. Only female OB-GYNs failed to differ from their male peers in this respect; although the FEMALE coefficient was positive for OB-GYNs, it is insignificant. (FEMALE was also insignificant for general surgeons, but remember that there are very few female surgeons.)

While there is no relationship between practice style (solo/group) and visit length for primary care specialties, there is a significant relationship in general surgery. General surgeons practicing alone spend considerably more time with patients than those in group practice (0.7 minutes more, on average), consistent with the positive coefficient on SOLO in our surgical subspecialist equation in Table 5-3.

Even when we look at the primary care specialties individually, we still find the longest office visits being provided in the West, and the shortest visits in the North Central region. Only OB-GYNs do not follow this pattern; for this group, visit lengths are virtually the same in the Northeast, North Central, and South, though somewhat longer in the West. Finally, the urban/rural differential in visit length holds for all primary care specialties but one -- rural pediatricians spend just as much time with their patients as do their urban colleagues.

5.4 Regression Results for Changes in Diagnostic Services

Means for all variables used in both the diagnostic and therapeutic service regressions are presented in Table 5-1 (along with length of visit). For two of the diagnostic services, laboratory tests and x-rays, all of the years were included (1974-1981). The remaining regressions had to be estimated on a shorter time frame (either 1975-1981 or 1977-1981, depending on the service), as data were not available for every year. All of the ancillary service equations are presented both for the sample as a whole and for the primary care, medical and surgical subsamples separately. Where appropriate, specialty-specific equations for the primary care specialists were also estimated. (A Pap test equation would be estimated for OB-GYNs, for example, but not for pediatricians.) Though not presented separately, these results are discussed in the text and the time trends summarized in Table 5-17.

Explanatory power of our diagnostic service regressions ranged from a low of 14 percent (for general exams) to a high of 78 percent (for vision tests). Once the sample is subset by specialty, R^2's tend to fall, of course, as a substantial amount of the specialty variation -- our most powerful predictor -- has been removed.

General and Limited Exams

Tables 5-5 and 5-6 display regression results for general and limited exams, respectively. It should be remembered that these two diagnostic services are mutually exclusive, i.e., a physician may provide a general exam or a limited exam, but would not, as a rule, provide both. The sum of the two types of exams for any individual physician, therefore, can never exceed 100 percent.

As we noted in the descriptive results, the overall frequency of general exams (i.e., the gross time trend) has been falling over the 1975-1981 period, while the use of limited exams has been on the rise. This remains the case even after other, confounding factors are held constant, suggesting that physicians are substituting more limited for general exams over time. The second (or net) TIME coefficient in eq. (16) implies that the percent of office visits, including some type of limited exam/history is increasing 2.7 percentage points every year -- or over 16 percentage points over the 1975-1981 period! This dramatic growth in limited exams is accompanied by a smaller, yet highly significant, decline in general exams of 0.44 percentage points annually.

The fact that limited exams are growing at a much faster rate than general exams are falling suggests that substitution of one type of exam for another cannot entirely explain the tremendous upsurge in limited exams. Furthermore, we know from Section 2.7 that if we were observing a pure substitution effect, length of visit should fall over time, which it doesn't. Rather, it appears that substitution accounts for only a small part of the trend, with the rest attributable to a pure increase in physicians' performance of limited exams on patients previously not receiving any type of exam.

Similar time trends in general and limited exams are apparent for the three physician subsets. Though the decline in general exams in primary care is not significant when TIME is the only variable in the equation, this negative trend becomes highly significant when specialty, casemix and physician characteristics are adjusted for. Other things constant, primary

TABLE 5-5

REGRESSION RESULTS FOR GENERAL EXAMS OVER TIME, 1975-1981

	TOTAL (12)	PRIMARY CARE (13)	MEDICAL SPECIALISTS (14)	SURGICAL SPECIALISTS (15)
TIME	-0.229**	-0.127	0.330	-0.660***
TIME	-0.440***	-0.570***	0.346	-0.680***
CASEMIX	7.89***	14.08***	-0.49	7.41***
FP	-0.08	-0.01	--	--
IM	1.60**	-0.11	--	--
OB-GYN	7.17***	6.94***	--	--
PED	19.07***	19.60***	--	--
GS	0.21	--	--	--
ALL	-11.13***	--	-16.80***	--
CARD	2.10	--	-0.70	--
DERM	-8.56***	--	-16.22***	--
OTHMED	3.39*	--	--	--
OPH	-8.92***	--	--	-8.67***
ORS	-3.34***	--	--	-3.24***
OTO	-4.43***	--	--	-4.34***
URO	-1.69	--	--	-1.68
OTHSURG	-4.18***	--	--	-4.30***
PSYCH	-29.45***	--	--	--
OTHERMD	-1.49	--	--	--
GPGSPEC	-1.25	-2.91**	--	--
IMSPEC	3.02**	2.61*	--	--
PEDSPEC	-2.93	-3.37	--	--
SECIM	2.00	--	1.52	--
SECGS	-1.54	--	--	-1.57
SOLO	0.64*	0.28	1.00	1.94***
BOARD	-0.46	0.28	0.43	-1.86**
FEMALE	4.71***	5.91***	-0.10	0.40
MDAGE	-0.30**	-0.34*	-0.87*	-0.07
MDAGESQ	0.0028**	0.0034*	0.0085*	-0.0003
NE	3.90***	4.60***	2.04	3.52***
SOUTH	1.69***	1.55**	0.22	3.13***
WEST	-1.79***	-3.12***	0.77	0.61
RURAL	-1.96***	-1.34**	-6.77***	-2.56***
Constant	17.75***	12.64**	42.18***	15.14**
R^2(c)	0.15	0.13	0.16	0.04
F(df)	(33,11179) =61.49***	(19,5967) =52.20***	(16,887) =12.13***	(18,3231) =8.82***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

TABLE 5-6

REGRESSION RESULTS FOR LIMITED EXAMS OVER TIME, 1975-1981

	TOTAL (16)	PRIMARY CARE (17)	MEDICAL SPECIALISTS (18)	SURGICAL SPECIALISTS (19)
TIME	2.591***	1.853***	2.747***	5.400***
TIME	2.676***	1.976***	2.069***	5.234***
CASEMIX	-4.16***	-4.15**	10.98**	-2.72
FP	-0.71	0.04	--	--
IM	-1.92*	-0.34	--	--
OB-GYN	-6.19***	-4.22***	--	--
PED	-17.14***	-15.02***	--	--
GS	-5.49***	--	--	--
ALL	-29.47***	--	-15.70***	--
CARD	-10.32***	--	-0.17	--
DERM	-1.98	--	15.53***	--
OTHMED	-10.65***	--	--	--
OPH	6.31***	--	--	10.28***
ORS	-0.72	--	--	3.21**
OTO	5.19***	--	--	10.56***
URO	-8.47***	--	--	-3.61*
OTHSURG	-0.39	--	--	3.63
PSYCH	-44.23***	--	--	--
OTHERMD	-0.46	--	--	--
GPGSPEC	-4.94***	-4.46***	--	--
IMSPEC	-2.68	-2.79	--	--
PEDSPEC	-7.74***	-7.74**	--	--
SECIM	5.19*	--	6.25**	--
SECGS	-0.08	--	--	-0.46
SOLO	-1.37**	-1.09	1.77	-2.55**
BOARD	0.14	-1.85*	1.41	3.70***
FEMALE	0.11	-0.47	5.01	6.60
MDAGE	-0.16	-0.29	0.46	0.14
MDAGESQ	0.0000	0.0012	-0.0067	-0.0031
NE	-4.91***	-4.80***	-2.23	-8.42***
SOUTH	-4.32***	-3.19***	-5.35*	-8.42***
WEST	-2.81***	-1.43	-5.99*	-6.72***
RURAL	0.36	0.42	0.50	0.17
Constant	66.99***	72.52***	22.11	42.36***
R^2(c)	0.16	0.07	0.12	0.16
F(df)	(33,11179) =69.79***	(19,5967) =27.81***	(16,887) =9.39***	(18,3231) =37.25***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

care physicians as a group are providing significantly fewer general exams each year despite the fact that neither general nor family practitioners have changed their general exam rates appreciably over the 1975-1981 period (see Table 5-17 below). Unlike the majority of other physicians, medical subspecialists show fairly constant rates of general exams, _ceteris paribus_, though their limited exam rates have been rising rapidly (over 2 percentage points per year). Finally, we note that surgical specialists are increasing their use of limited exams far more quickly than any other group of physicians -- by over 5 percentage points per year. Undoubtedly a large portion of this rapid increase is due to general surgeons, who alone increased their use of limited exams by almost one-third in just 7 years (recall Table 3-6).

As casemix becomes more complex, physicians are more likely to provide a general exam than a limited one, as one might expect. This is indicated by a negative coefficient on CASEMIX in our limited exam equations, and a positive coefficient in the general exam equations. This result obtains in all cases but one -- medical specialists are actually _more_ likely to provide a limited exam as casemix worsens, rather than a general one.

Variations in limited and general exams by specialty were are generally consistent with those noted earlier in the descriptive work. The only specialties with higher rates of limited exams than GPs are ophthalmologists and otolaryngologists (eq. 16). Most of the other specialties provided notably fewer limited exams than GPs, with the important exception of FPs who were no different. General exams are most frequently provided by pediatricians, followed by OB-GYNs. Internists (IM), especially those with a secondary specialty in allergy or cardiology (IMSPEC), are also significantly more likely to do a general exam than GPs. Specialties _least_ likely to do a comprehensive exam include psychiatrists, and a number of the medical and surgical subspecialists, such as allergists, dermatologists, and ophthalmologists, who all tend to focus their treatment on a very specific part of the body.

Solo practitioners are less likely to perform limited exams than their colleagues in group practice, but are more likely to do general exams (eq. 12 and 16), even after adjusting for casemix. This result is primarily attributable to the surgical subspecialists, as SOLO was insignificant for primary care physicians and medical subspecialists. One explanation may be the internal referral network in group practices; if, say, a colleague had performed a general exam on the patient, for example, there would be no need to do one again.

Being board-certified (BOARD) has no effect on the propensity to provide either a general or limited exam -- at least not for all physicians as a group. Board-certified surgical subspecialists constitute one important exception to this rule; this group is actually more likely to substitute a limited for a general exam than their less credentialled colleagues. Board-certified primary care practitioners also do fewer limited exams than their non-board-certified counterparts, though the difference is small (1.8 percentage points; see eq. 17).

Consistent with their greater visit lengths, female physicians are far more likely to perform a general exam during a visit than male physicians, even after casemix and specialty are held constant (while just as likely to do a limited exam). The FEMALE coefficient in eq. (12) implies that the proportion of female physicians' visits involving a general exam is nearly five percentage points higher than the comparable level for male physicians (around a mean of 18 percent). Disaggregating the physician sample into specialty groups shows this female effect to be solely attributable to primary care physicians, for there were no variations in general exams by physician sex for either medical or surgical subspecialists.

Physician age does influence the probability that a visit will include a general exam, but has no effect on limited exams. As in length of visit, rates for general exams follow a U-shaped pattern with respect to age. For the sample as a whole, general exam rates are lowest on average when physicians are in their early fifties. The fact that general exam rates and visit lengths rise and fall together is no accident, as the provision of a general exam <u>implies</u> a longer visit, <u>ceteris paribus</u> (recall Section 2.7 above).

There are considerable geographic variations in the use of both general and limited exams. Where general exam rates are higher (e.g., the Northeast, South), limited exams tend to be done with less frequency, suggesting some degree of substitution. The West is interesting in that it has the lowest rates of general exams (5.7 percentage points less than the Northeast, for example), yet the longest visit lengths. Whatever is the source of these longer visits, it's clearly <u>not</u> more general exams. Urban/rural differences in exam rates are also evident, at least for general exams. General exams are more often performed in SMSAs than in non-SMSAs, with the largest differences for medical subspecialists, consistent with their especially long visits.

Lab Tests and X-rays

Contrary to popular belief, the overall use of lab tests and x-rays by office-based physicians has not been increasing over time once other factors like casemix and specialty mix are held constant (see Tables 5-7 and 5-8). Only medical subspecialists (eq. 22) are ordering more lab tests every year; this group has increased their use of lab tests by close to 3 percentage points over the 1974-1981 period (around a mean of 15 percent). (The gross time trend for medical subspecialists was insignificant, suggesting that increases in lab test use are offset by specialty shifts.)

At the same time that their reliance on laboratory tests has increased, medical subspecialists' use of x-rays has declined by approximately the same amount in absolute terms (eq. 26). Surgical subspecialists, by contrast, who have the highest rates of x-ray utilization to begin with (12% of visits), show a small, but statistically significant, increase in x-ray use over time.

As casemix becomes increasingly complex, physicians are more likely to order x-rays for a patient, but are not more inclined to perform a lab test. Only medical subspecialists provide an exception to this rule; this group is actually less likely to order lab tests as casemix worsens. It should be noted, however, that our measure of lab tests does not tell us anything about the intensity with which lab tests are ordered for patients receiving tests; rather, it only measures the probability of a test being ordered. Thus, lab test intensity may be changing while the likelihood of receiving a lab test is not.

Most of our earlier findings regarding specialty and lab test/x-ray utilization are confirmed in the multivariate analysis. FPs again show higher utilization rates of both services relative to GPs, though only for lab tests was the difference statistically significant. Perhaps the most interesting specialty results in Tables 5-7 and 5-8 are for physicians practicing outside their primary specialty. General surgeons doing some primary care (GPGSPEC) use significantly more x-rays than the average general surgeon, for example. "Super-internists" (IMSPEC) also have higher utilization rates, both of lab tests and x-rays, than other internists. (They have far higher utilization rates than "pure" medical subspecialists as well.) The same is true of medical subspecialists providing some general internal medicine; as hypothesized, these two groups (SECIM and IMSPEC) appear to be quite similar.

Solo practitioners use significantly fewer x-rays and lab tests than do their colleagues in group practice, even after specialty is held constant.

TABLE 5-7

REGRESSION RESULTS FOR LAB TEST UTILIZATION OVER TIME, 1974-1981

	TOTAL (20)	PRIMARY CARE (21)	MEDICAL SPECIALISTS (22)	SURGICAL SPECIALISTS (23)
TIME	0.123	0.351***	0.324	-0.194
TIME	0.010	-0.068	0.396*	-0.031
CASEMIX	-0.94	0.76	-9.47***	2.25**
FP	3.93***	3.70***	--	--
IM	13.67***	11.65***	--	--
OB-GYN	21.51***	18.97***	--	--
PED	0.68	-1.73*	--	--
GS	-11.24***	--	--	--
ALL	-14.94***	--	16.99***	--
CARD	-0.77	--	0.12	--
DERM	-14.74***	--	-17.90***	--
OTHMED	-0.80	--	--	--
OPH	-19.91***	--	--	-8.78***
ORS	-21.02***	--	--	-7.93***
OTO	-17.88***	--	--	5.49***
URO	46.26***	--	--	59.28***
OTHSURG	-18.21***	--	--	-5.95***
PSYCH	-17.44***	--	--	--
OTHERMD	-4.72	--	--	--
GPGSPEC	1.03	-0.34	--	--
IMSPEC	3.03***	2.78**	--	--
PEDSPEC	0.56	0.57	--	--
SECIM	11.41***	--	10.97***	--
SECGS	-0.13	--	--	0.29
SOLO	-2.85***	-3.81***	-3.26***	0.40
BOARD	1.54***	4.43***	1.14	-2.73***
FEMALE	7.24***	9.27***	0.51	-0.52
MDAGE	0.02	0.01	0.10**	0.06***
MDAGESQ	--	--	--	--
NE	-3.06***	-3.98***	-0.89	-1.57***
SOUTH	1.30***	1.95***	1.78	0.31
WEST	-1.36***	-1.76**	0.36	-0.01
RURAL	-0.65*	-1.36**	-1.58	0.87*
Constant	22.84***	23.09***	28.30***	6.71***
R^2(c)	0.39	0.18	0.32	0.68
F(df)	(32,13000) =272.49***	(18,6917) =93.04***	(15,1048) =36.78***	(17,3766) =498.52***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

TABLE 5-8

REGRESSION RESULTS FOR X-RAY UTILIZATION OVER TIME, 1974-1981

	TOTAL (24)	PRIMARY CARE (25)	MEDICAL SPECIALISTS (26)	SURGICAL SPECIALISTS (27)
TIME	0.028	0.029	-0.354**	0.347***
TIME	-0.032	-0.029	-0.398***	0.146*
CASEMIX	3.05***	3.48***	2.95**	6.22***
FP	0.42	0.39	--	--
IM	5.10***	4.67***	--	--
OB-GYN	-6.48***	-6.99***	--	--
PED	-4.81***	-5.25***	--	--
GS	0.82**	--	--	--
ALL	-6.71***	--	9.44***	--
CARD	3.82***	--	1.54	--
DERM	-6.53***	--	-8.79***	--
OTHMED	2.19***	--	--	--
OPH	-7.95***	--	--	-10.03***
ORS	28.95***	--	--	27.75***
OTO	-2.90***	--	--	-3.88***
URO	0.52	--	--	-0.31
OTHSURG	-0.05	--	--	-1.04
PSYCH	-12.69***	--	--	--
OTHERMD	2.85***	--	--	--
GPGSPEC	1.48***	1.72***	--	--
IMSPEC	3.18***	3.09***	--	--
PEDSPEC	-0.03	-0.08	--	--
SECIM	3.91***	--	3.97***	--
SECGS	0.62	--	--	0.64
SOLO	-2.71***	-2.65***	-2.00***	-2.61***
BOARD	0.61***	1.23***	0.27	0.23
FEMALE	-0.03	0.19	0.84	-1.46
MDAGE	0.17***	0.26***	0.54**	-0.16
MDAGESQ	-0.0017***	-0.0026***	-0.0049**	0.0012
NE	-0.89***	-1.03***	-0.14	-0.71
SOUTH	0.56***	0.78***	1.76*	-0.08
WEST	0.25	0.62**	0.10	-0.85
RURAL	-1.91***	-2.22***	-1.93*	-0.99**
Constant	2.27	-0.06	-4.14	8.60**
R^2(c)	0.46	0.27	0.32	0.60
F(df)	(33,12999) =344.99***	(19,1619) =140.07***	(16,1047) =35.00***	(18,3765) =12.20***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

This may be attributable to the greater availability of support staff and capital equipment in group practices, making it easier to order a lab test or x-ray for the marginal patient.

In our length of visit regressions, we found board-certified primary care practitioners spending significantly longer with patients than their non-board-certified peers. At the same time, there were no real differences in visit length associated with board-certification for either of the subspecialty groups, suggesting greater physician (and visit) homogeneity at this level of specialization. The same is true of lab tests and x-ray utilization: although board-certified primary care physicians provide significantly more of both types of ancillaries than their less credentialled colleagues, there were no differences for the medical and surgical subspecialties. (Only board-certified surgical subspecialists were an exception to this rule with their lower lab test rates.)

Female physicians are no more likely to order x-rays than male physicians, but are more likely to do lab tests, _ceteris paribus_. Whereas male physicians recommend lab tests in about 22 percent of their visits, the comparable number for female physicians is 29 percent (adding the FEMALE coefficient to the sample mean). The lab test differential is even larger for primary care physicians alone: 28 percent for male physicians versus 37 percent for their female counterparts. At least in this respect, women physicians _are_ providing a somewhat different office visit than male physicians, partially explaining their longer visit lengths.

Although physician age has no effect on the probability that a lab test will be ordered, it does influence x-ray utilization in office-based practices. Physicians' use of x-rays tends to rise through about age fifty, declining slowly thereafter. Only for surgical subspecialists was this not the case; this group showed no statistically significant relationship between x-ray use and physician age.

Rates for both x-rays and lab tests are highest in the Southern portion of the country, and lowest in the Northeast. Rural areas also have lower utilization rates of both of these ancillary services, consistent with the shorter visit lengths in non-SMSAs.

ECGs

Taken individually, the gross time trends in electrocardiogram use for our three physician subsets have been fairly constant over the 1975-1981 period, consistent with the descriptive results of Chapter 3 (see Table 5-9). Once we

TABLE 5-9

REGRESSION RESULTS FOR ECG UTILIZATION OVER TIME, 1975-1981

	TOTAL (28)	PRIMARY CARE (29)	MEDICAL SPECIALISTS (30)	SURGICAL SPECIALISTS (31)
TIME	-0.085**	-0.066	-0.381	-0.038
TIME	-0.123***	-0.156***	-0.247	-0.023
CASEMIX	3.47***	5.45***	2.42	1.25***
FP	0.24	0.25	--	--
IM	8.68***	7.95***	--	--
OB-GYN	-2.60***	-3.02***	--	--
PED	-2.08***	-2.20***	--	--
GS	-1.28***	--	--	--
ALL	-2.35***	--	-5.54***	--
CARD	31.79***	--	28.89***	--
DERM	-2.45***	--	-5.80***	--
OTHMED	3.08***	--	--	--
OPH	-3.52***	--	--	-1.34***
ORS	-3.08***	--	--	-1.08***
OTO	-2.66***	--	--	-1.08***
URO	-2.55***	--	--	-0.71***
OTHSURG	-1.42***	--	--	0.44**
PSYCH	-9.53***	--	--	--
OTHERMD	-0.17***	--	--	--
GPGSPEC	-0.20	-0.45	--	--
IMSPEC	4.46***	4.24***	--	--
PEDSPEC	-0.06	-0.25	--	--
SECIM	-1.42**	--	-1.39	--
SECGS	-0.13	--	--	0.00
SOLO	-0.67***	-0.78***	-1.65*	-0.13
BOARD	0.40**	1.07***	1.08	-0.78***
FEMALE	-0.14	-0.06	1.24	-0.49
MDAGE	0.17***	0.25***	0.08	-0.01
MDAGESQ	-0.0014***	-0.0022***	-0.0011	0.0003
NE	0.13	0.06	1.08	-0.15
SOUTH	0.63***	0.95***	0.79	0.03
WEST	-0.01	0.10	-0.63	0.04
RURAL	-1.20***	-1.34***	-4.96***	-0.20
Constant	-4.35***	-8.40***	4.01	0.68
R^2(c)	0.42	0.35	0.53	0.07
F(df)	(33,11179) =260.40***	(19,5967) =185.81***	(16,887) =68.81***	(18,3231) =14.73***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

combine primary care practitioners with their colleagues in the medical and surgical subspecialties (eq. 18), however, we find that ECG use has actually been falling gradually at a rate of 0.08 percentage points per year (or a total of 0.48 percentage points over time). Although this figure may seem very small, recall that the mean for ECGs is only 3 percent, implying that physicians' office use of ECGs has fallen by nearly one-fifth from 1975 to 1981 (i.e., 0.48/3.0 = 16%).*

When specialty shifts and other changes are taken into account, the observed decrease in ECG utilization is even <u>greater</u> -- 0.12 percentage points annually. This decline is largely attributable to lower ECG rates in primary care, as medical subspecialists have not significantly changed their use of ECG over time. A closer look at this trend in primary care reveals that internists are primarily responsible for this decline, accompanied by the general practitioners (see Table 5-17 below).

Yet why should internists be cutting back on their use of ECGs in the office? Improved health status due to declining heart disease mortality rates is one explanation, but our analysis holds casemix constant. Similarly, if per capita visit rates for cardiac patients were rising, internists may be less inclined to do an ECG during any one visit, resulting in lower ECG rates overall. There is no empirical evidence to support such a utilization increase, however. A third explanation is the fact that ECGs have been discredited as a screening tool and as a necessary component of a routine check-up (Canadian Task Force, 1979).

As expected, cardiologists have the highest rates of ECG utilization, followed by internists and other medical subspecialists. Even more likely to order an ECG than the average internist is the internist with a medical secondary specialty, like cardiology (IMSPEC). Whereas a "pure" internist provides an ECG in about 13 percent of his visits, the comparable number for a "super internist" is over 17 percent.

Solo practitioners do fewer ECGs than group practice physicians, probably because they are less likely to have the necessary office equipment or support staff. Again we find greater ancillary use by board-certified, primary care physicians, who do significantly more ECGs than their non-board-certified peers. (Although surgical subspecialists who are board-certified do

*The reader should recall that using OLS on a dependent variable with such a large concentration of zeroes may yield biased and inefficient results. These estimates should thus be interpreted with caution.

significantly fewer ECGs, the number of visits with positive values are so few that these results become highly questionable.) There were virtually no differences in ECG use between male and female physicians in any of the specialty groups.

Like our findings for lab tests and x-rays, we find the greatest utilization of ECGs in the South. One possible explanation is casemix differences not explicitly captured by our casemix index. It is highly unlikely that this is the answer, however, since similar results obtain for our chronic ischemic heart disease tracer (see Chapter 6 below), where there is no casemix variation at all (by definition). It may be that Southern physicians are more likely to invest in the capital equipment required for ECGs because they treat so many elderly patients. (According to the 1981 Statistical Abstracts, almost one-third of all Americans age sixty-five or older live in the South, primarily in Texas or Florida.) If this were the case, we might expect higher utilization in the South merely because the equipment is more readily available. A similar "capital supply" argument may explain the high ECG rates of urban physicians relative to their rural colleagues.

Vision Tests

As seen in Table 5-10, the gross time trend in vision tests is positive and significant (eq. 32), largely because of an increase in vision tests by the surgical subspecialists (which include ophthalmologists). The statistical significance of this total time trend disappears when other factors are held constant, however, despite the fact that both primary care physicians and surgical subspecialists are doing notably more vision tests every year, *ceteris paribus*. The rate of increase is especially large for the latter, about 1.1 percentage point *per year* (or 6.6 percentage points over the 1975-1981 time series). Given that ophthalmologists are the only surgical specialists doing vision tests with any frequency, this tremendous growth rate is undoubtedly attributable to this specialty alone. For the primary care practitioners, vision tests are increasing much more slowly, less than 0.1 percentage points annually.

As expected, ophthalmologists have by far the highest vision test rates, followed by other medical specialists and pediatricians. Many of the other vision tests results also come as no surprise: vision tests are less frequently performed in rural areas and by solo practitioners, consistent with our other ancillary findings. There were no differences in vision tests associated with board-certification or physician gender.

TABLE 5-10

REGRESSION RESULTS FOR VISION TESTS OVER TIME, 1975-1981

	TOTAL (32)	PRIMARY CARE (33)	MEDICAL SPECIALISTS (34)	SURGICAL SPECIALISTS (35)
TIME	0.211**	-0.005	0.037	0.971***
TIME	0.049	0.093*	0.034	1.101***
CASEMIX	2.04***	1.20***	0.08	6.71***
FP	-0.05	0.42*	--	-1.14
IM	-0.36	0.10	--	--
OB-GYN	-1.58***	-1.25***	--	--
PED	2.39***	2.38***	--	--
GS	-0.60	--	--	--
ALL	-1.26	--	-2.13***	--
CARD	-1.20	--	-1.81***	--
DERM	-1.43***	--	-2.91***	--
OTHMED	0.17	--	--	--
OPH	72.47***	--	--	72.13***
ORS	-1.74***	--	--	2.52**
OTO	0.94*	--	--	1.85
URO	-1.56**	--	--	-1.24
OTHSURG	0.27	--	--	-1.14
PSYCH	-5.50***	--	--	--
OTHERMD	4.28***	--	--	--
GPGSPEC	-0.23	-0.40	--	--
IMSPEC	-0.27	-0.09	--	--
PEDSPEC	-0.83	-0.46	--	--
SECIM	-0.77	--	-0.89	--
SECGS	-0.97	--	--	-0.99
SOLO	-0.62***	-0.22	0.08	-2.42***
BOARD	-0.16	-0.05	-0.49	-0.79
FEMALE	0.48	0.30	0.11	1.31
MDAGE	0.13**	0.05	0.07	0.30
MDAGESQ	-0.0013**	-0.0004	-0.0008	-0.0038
NE	-0.40*	-0.13	0.28	-0.27
SOUTH	-0.11	-0.37**	1.17**	0.39
WEST	-0.50**	-0.10	0.35	-1.10
RURAL	-0.91***	-0.29*	-0.31	-2.38***
Constant	-2.89*	-1.77	1.15	-14.38**
R^2(c)	0.78	0.05	0.05	0.82
F(df)	(33,11179) =1300.71***	(19,4024) =12.49***	(16,636) =2.37**	(18,2143) =576.31***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

Pap Tests

Earlier in Chapter 3 it appeared that Pap tests were declining slowly over time, supporting our contention that physicians are adopting the new appropriateness standards for Pap test utilization. Table 5-11 confirms this result; Pap tests are being performed less frequently, even after casemix and specialty mix are held constant. During the 1977-1981 period that data were available, Pap tests declined in use by 20 percent ((-0.26*4)/4.91, the sample mean).

Exactly who is responsible for this decline in Pap tests? Is it just OB-GYNs, who have the highest Pap test rates of all specialty groups, or are other physicians cutting back as well? Specialty-specific regressions for primary care physicians (not shown) indicate that GPs, internists and OB-GYNs are all providing significantly fewer Pap tests every year. Only FPs, who actually perform even more Pap tests than GPs (see eq. 36), haven't altered the frequency with which they do these tests over time.

Perhaps the most interesting finding in Table 5-11 is the higher Pap test rate of female physicians. Other things constant, female physicians perform Pap tests in about 8 percent of their office visits, compared with 5 percent for male physicians. If female physicians treat a disproportionate number of female patients, for example, this could explain their greater utilization of Pap tests, but patient sex is explicitly captured in our casemix index.

In contrast to most other ancillary services, there is very little geographic variation in Pap test utilization. The only real difference was between urban and rural areas, where we find significantly lower rates in non-SMSAs.

5.5 Regression Results for Changes in Therapeutic Services

Taken as a group, our independent variables explained less than a quarter of the variation in counselling and physiotherapy over time (with R^2's of 0.24 and 0.20, respectively) and about 42-43 percent of the variation in office surgery and family planning. The only equation which was not significantly different from zero at the one percent level or better was family planning by medical subspecialists (eq. 50), primarily because they do so little family planning to begin with. (The mean for this group was less than one percent.)

TABLE 5-11

REGRESSION RESULTS FOR PAP TEST UTILIZATION OVER TIME, 1977-1981

	TOTAL (36)	PRIMARY CARE (37)	MEDICAL SPECIALISTS (38)	SURGICAL SPECIALISTS (39)
TIME	-0.253***	-0.289**	0.031	-0.106***
TIME	-0.263***	-0.315***	0.066	-0.114***
CASEMIX	2.81***	5.10***	-0.19	1.05***
FP	1.35***	1.37***	--	--
IM	-0.85***	-1.88***	--	--
OB-GYN	27.64***	26.96***	--	--
PED	-3.72***	-4.21***	--	--
GS	-1.99***	--	--	--
ALL	-4.14***	--	-0.79***	--
CARD	-4.01***	--	0.26	--
DERM	-3.54***	--	0.81***	--
OTHMED	-4.31***	--	--	--
OPH	-4.46***	--	--	-1.81***
ORS	-4.03***	--	--	-1.40***
OTO	-3.57***	--	--	-1.43***
URO	-3.74***	--	--	-1.21***
OTHSURG	-3.81***	--	--	-1.42***
PSYCH	-9.11***	--	--	--
OTHERMD	-2.69***	--	--	--
GPGSPEC	-0.16	-0.80	--	--
IMSPEC	0.11	-0.10	--	--
PEDSPEC	-0.34	-0.57	--	--
SECIM	0.65	--	0.60***	--
SECGS	-0.22	--	--	-0.15
SOLO	-0.99***	-1.59***	0.11	0.16*
BOARD	0.77***	1.68***	-0.37**	-0.41***
FEMALE	3.03***	4.06***	0.51	0.73
MDAGE	0.04***	0.06***	0.01*	0.01**
MDAGESQ	--	--	--	--
NE	-0.03	0.05	0.08	-0.19
SOUTH	0.09	0.29	0.28	-0.21*
WEST	-0.18	0.23	0.07	0.05
RURAL	-0.32*	-0.50*	0.63**	0.26**
Constant	0.75	-1.68	0.04	1.02***
$R^2(c)$	0.65	0.64	0.12	0.14
F(df)	(32,7558) =465.21***	(18,4025) =415.46***	(15,637) =7.07***	(17,2144) =23.62***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

Office Surgery

The gross time trend in office surgery rates over the 1975-1981 period was significant and positive, both for all physicians as a group and for primary care practitioners and medical subspecialists individually (Table 5-12, row 1). Only the surgical subspecialists are doing less office surgery over time, cutting their office surgery rates by about 0.4 percentage points per year.

Once specialty mix, casemix and physician characteristics are adjusted for, the time trend in office surgery rates is no longer significant, although still positive. Offsetting trends in primary care and the surgical subspecialties explain this null finding: while primary care physicians have increased their office surgery rates by 1.1 percentage points over the seven year time-series, surgical subspecialists have decreased theirs by approximately the same amount. (Although the time trend for surgical subspecialists did not attain statistical significance at conventional levels, the t-statistic for TIME was nearly significant at 1.54.)

Why the increase in primary care? Apparently, pediatricians and OB-GYNs are the cause, as neither GPs nor FPs are doing more office surgery over time (see Table 5-17 below). One explanation for the increase in OB-GYN surgery is a substitution of ambulatory for inpatient care, e.g., OB-GYNs may be doing more D & Cs in their offices rather than in the hospital. Why pediatricians should be increasing their use of office surgery is less clear, although a shift of minor accident cases (e.g., sprains, lacerations, etc.) away from hospital emergency rooms is one explanation.

As casemix becomes increasingly complex, rates of office surgery begin to fall, presumably because the most serious cases are treated in the hospital. Not surprisingly, the CASEMIX coefficient is especially large in the surgical subspecialties (-9.7), where we would expect office/hospital substitution to be most common.

As seen in eq. (40), dermatologists, general surgeons and nearly all of the surgical subspecialists are far more likely to do office surgery than other physicians. Of course, the nature of the office surgery being performed by these specialty groups varies tremendously, with dermatologists removing skin blemishes and warts while surgeons set broken bones and handle much more complex types of problems.

For most of our diagnostic services, we found higher use rates associated with board-certification in the primary care specialties, with no real differences for the subspecialists. Just the opposite is true of office

TABLE 5-12

REGRESSION RESULTS FOR OFFICE SURGERY UTILIZATION OVER TIME, 1975-1981

	TOTAL (40)	PRIMARY CARE (81)	MEDICAL SPECIALISTS (42)	SURGICAL SPECIALISTS (43)
TIME	0.094*	0.135***	0.720**	-0.382***
TIME	0.061	0.177***	0.206	-0.169
CASEMIX	-3.10***	-1.49***	0.00	-9.67***
FP	0.64**	0.38*	--	--
IM	-3.34***	-3.05***	--	--
OB-GYN	-1.55***	-0.58**	--	--
PED	-1.94***	-0.71**	--	--
GS	12.10***	--	--	--
ALL	-3.13***	--	0.91	--
CARD	-3.31***	--	-0.36	--
DERM	28.68***	--	32.64***	--
OTHMED	-2.54***	--	--	--
OPH	-0.92**	--	--	-10.99***
ORS	8.39***	--	--	-3.12***
OTO	7.09***	--	--	-5.17***
URO	11.66***	--	--	0.35
OTHSURG	10.43***	--	--	-1.26
PSYCH	0.75	--	--	--
OTHERMD	7.13***	--	--	--
GPGSPEC	0.52	2.58***	--	--
IMSPEC	-0.45	-0.41	--	--
PEDSPEC	-0.67	-0.53	--	--
SECIM	-1.07	--	-0.68	--
SECGS	1.88***	--	--	1.83**
SOLO	-1.14***	-1.14***	-0.19	-0.84*
BOARD	0.90***	-0.21	2.29**	2.60***
FEMALE	-0.20	-1.16***	3.46	2.59
MDAGE	0.03***	0.01*	-0.08*	0.10***
MDAGESQ	--	--	--	--
NE	0.81***	-0.26	4.79***	2.76***
SOUTH	-0.18	-0.84***	2.81**	0.91
WEST	1.15***	0.31	5.36***	1.74**
RURAL	0.38*	0.27	-1.49	1.09*
Constant	6.52***	6.04***	-0.53	20.10***
R^2(c)	0.42	0.09	0.59	0.19
F(df)	(32,11180) =264.73***	(18,5968) =35.94***	(15,888) =96.45***	(17,3232) =48.77***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

surgery; here we find the board-certified subspecialists doing more office surgery than non-board-certified physicians (by over two percentage points, on average), but no differences in primary care. Although the board coefficient is reduced by a factor of two when all physicians are combined (eq. 40), it remains highly significant.

As physicians get older, they do a greater amount of office surgery. Only for medical subspecialists was this not the case; for this group, age is negatively related to office surgery rates. Finally, we find solo practitioners doing significantly less office surgery than group practice physicians.

Descriptive work on office surgery showed the West as having the highest rates in the nation, 1-2 percentage points above other regions. Holding casemix constant, we see that office surgery rates are indeed highest in the West, 1.2 percentage points above the South and North Central regions, and about 0.3 percentage points above the Northeast. One reason the West may have such high surgery rates is that Western physicians are more likely to treat patients on an ambulatory basis.

Counselling

According to Table 5-13, physicians in all specialties -- medical, surgical and primary care--are doing more and more counselling every year, *ceteris paribus*. (Recall that our counselling variable includes medical and diet counselling as well as therapeutic listening.) Based on an average growth rate of 2.2 percentage points annually, it is estimated that the probability that a visit will include some form of counselling has increased about 15 percentage points from 1974 to 1981, around a mean of 26 percent. For the medical and surgical subspecialties alone, the growth rate has been somewhat slower, but remains substantial -- 4-6 percentage points over the period.

Although their visits aren't any longer, family practitioners are significantly more likely to counsel their patients than GPs (eq. 44). *All* of the primary care specialties do more counselling than GPs, in fact. Just the opposite is true of the medical and surgical subspecialists, who generally do far less counselling. Psychiatrists are the most likely to provide counselling, of course.

TABLE 5-13

REGRESSION RESULTS FOR COUNSELLING OVER TIME, 1974-1981

	TOTAL (44)	PRIMARY CARE (45)	MEDICAL SPECIALISTS (46)	SURGICAL SPECIALISTS (47)
TIME	2.460***	3.195***	0.872**	0.952***
TIME	2.164***	2.809***	0.649*	0.878***
CASEMIX	14.09***	16.52***	6.98**	9.88***
FP	7.26***	6.34***	--	--
IM	6.89***	5.62***	--	--
OB-GYN	6.83***	6.16***	--	--
PED	4.43***	4.04***	--	--
GS	-2.83***	--	--	--
ALL	-11.99***	--	19.66***	--
CARD	-3.54	--	-8.52***	--
DERM	-9.55***	--	-17.88***	--
OTHMED	4.10	--	--	--
OPH	-16.13***	--	--	-11.72***
ORS	-0.15	--	--	3.49***
OTO	-4.15***	--	--	-1.38
URO	-1.93	--	--	1.36
OTHSURG	0.17	--	--	3.87**
PSYCH	41.92***	--	--	--
OTHERMD	-0.93	--	--	--
GPGSPEC	-1.73	-2.92*	--	--
IMSPEC	3.17**	3.30*	--	--
PEDSPEC	-2.52	-2.45	--	--
SECIM	8.77***	--	8.16***	--
SECGS	-2.76	--	--	-2.82*
SOLO	-0.25	-0.72	-0.24	0.99
BOARD	1.53**	1.69*	3.24*	1.37
FEMALE	8.32***	8.93***	9.54**	4.09
MDAGE	0.08	0.09	0.75	-0.25
MDAGESQ	-0.0017	-0.0017	-0.0074	0.0006
NE	0.03	-0.15	-1.04	0.87
SOUTH	-2.58***	-3.26***	0.37	-1.98*
WEST	2.13***	3.05***	-3.79	2.30*
RURAL	0.01	-0.12	6.28**	-1.11
Constant	-0.05	-4.92	1.88	15.89*
$R^2(c)$	0.24	0.12	0.16	0.05
F(df)	(33,12999) =132.24***	(19,6916) =51.02***	(16,1047) =13.92***	(18,3765) =12.20***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

Even after casemix is held constant, we find female physicians doing notably more counselling than their male colleagues. Whereas one out of four visits to a male physician involves some sort of counselling, the comparable figure for female physicians is one out of three. Undoubtedly this explains at least part of the longer office visits of female physicians.

The probability that an office visit will include counselling varies considerably across the country, being highest in the West and lowest in the South. Interestingly enough, there were no real differences in counselling rates between urban and rural areas with one exception -- medical subspecialists located in non-SMSAs were actually more likely to counsel their patients than were their urban peers.

Family Planning

Like counselling, family planning has been on the rise over the past decade, albeit at a much slower rate (about 0.2 percentage points per year; see Table 5-14.) Virtually all of this increase can be attributed to OB-GYNs, the only specialty providing this service with any frequency. Solo practitioners appear to be doing slightly less family planning than their group practice peers; family planning rates also decline with physician age. Finally, we find family planning to be less common in the South relative to other parts of the nation, with no differences between urban and rural areas.

Physiotherapy

Regression results for the final therapeutic service considered in this effort, physiotherapy, are presented in Table 5-15. There is a fairly large, positive time trend in physicians' use of physiotherapy: 0.39 percentage points per year, other things constant. Medical subspecialists are the only group of specialists not doing any more physiotherapy over time; rather, these physicians may well be doing less. (While not statistically significant by conventional standards, the t-statistic for TIME in eq. (54) was still quite high, 1.59.) An increase in the number of DO visit shares can't be the reason, as DOs have specifically been excluded from these regressions. Rather, it appears that MDs themselves are doing more and more physiotherapy, particularly those in family practice, internal medicine, and surgery (see Table 5-17 below). One possible explanation for this trend is that physicians are becoming increasingly aware of new physiotherapy modalities, like whirlpools or ultrasound, which they are beginning to recommend to patients. (Remember that the physician need not provide the service, he need only

TABLE 5-14

REGRESSION RESULTS FOR FAMILY PLANNING OVER TIME, 1977-1981

	TOTAL (48)	PRIMARY CARE (49)	MEDICAL SPECIALISTS (50)	SURGICAL SPECIALISTS (51)
TIME	0.177***	0.276***	-0.015	0.026
TIME	0.175***	0.251***	-0.023	0.025
CASEMIX	-0.37	-0.53	-0.07	0.38**
FP	-0.10	-0.32	--	--
IM	-1.01***	-1.25***	--	--
OB-GYN	10.96***	10.65***	--	--
PED	-1.25***	-1.60***	--	--
GS	-0.96***	--	--	--
ALL	-1.24***	--	-0.25**	--
CARD	-1.19*	--	-0.16	--
DERM	-1.51***	--	-0.23*	--
OTHMED	-1.11**	--	--	--
OPH	-1.30***	--	--	-0.40***
ORS	-1.41***	--	--	-0.20**
OTO	1.31***	--	--	-0.22**
URO	0.08	--	--	1.23***
OTHSURG	-1.24***	--	--	-0.19
PSYCH	-0.30	--	--	--
OTHERMD	-0.55	--	--	--
GPGSPEC	-0.00	-0.01	--	--
IMSPEC	-0.04	0.01	--	--
PEDSPEC	-0.01	0.08	--	--
SECIM	0.06	--	0.08	--
SECGS	-0.15	--	--	-0.03
SOLO	-0.29***	-0.40**	0.04	0.00
BOARD	0.13	0.27	-0.03	-0.07
FEMALE	0.54**	0.61	0.12	0.73**
MDAGE	-0.03***	-0.05***	-0.00	0.00
MDAGESQ	--	--	--	--
NE	-0.19	-0.19	0.08	-0.19**
SOUTH	-0.49***	-0.61***	0.16*	-0.29***
WEST	-0.21	-0.26	0.12	-0.22**
RURAL	-0.00	-0.01	0.09	0.05
Constant	2.53***	3.32***	0.55*	0.14
R^2(c)	0.43	0.42	0.03	0.09
F(df)	(32,7558) =185.71***	(18,4025) =171.81***	(15,637) =1.42	(17,2144) =14.46***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

TABLE 5-15

REGRESSION RESULTS FOR PHYSIOTHERAPY OVER TIME, 1975-1981

	TOTAL (52)	PRIMARY CARE (53)	MEDICAL SPECIALISTS (54)	SURGICAL SPECIALISTS (55)
TIME	0.403***	0.271***	0.264	0.860***
TIME	0.391***	0.494***	-0.571	0.459***
CASEMIX	-0.34	-0.40	4.01*	1.32
FP	-0.02	0.03	--	--
IM	-0.51*	-0.52*	--	--
OB-GYN	-1.82***	-2.10***	--	--
PED	-1.84***	-2.18***	--	--
GS	-0.31	--	--	--
ALL	-1.91***	--	-1.03	--
CARD	-0.85	--	-0.87	--
DERM	7.38***	--	11.48***	--
OTHMED	-0.01	--	--	--
OPH	-1.62***	--	--	-1.68**
ORS	12.97***	--	--	15.68***
OTO	-1.56***	--	--	-1.26*
URO	0.09	--	--	1.11
OTHSURG	1.06*	--	--	1.82**
PSYCH	-1.19	--	--	--
OTHERMD	7.80***	--	--	--
GPGSPEC	-0.52	0.19	--	--
IMSPEC	0.65	1.27***	--	--
PEDSPEC	-0.11	-0.08	--	--
SECIM	-0.62	--	-0.73	--
SECGS	-0.31	--	--	-0.04
SOLO	-0.36**	-0.48***	-0.99	-0.43
BOARD	-0.38**	-0.05	0.40	-1.79***
FEMALE	-0.47	0.04	-4.97**	1.60
MDAGE	0.04***	0.01	0.22***	0.03
MDAGESQ	--	--	--	--
NE	0.12	-0.04	-3.19**	0.82
SOUTH	0.03	0.16	-0.57	0.11
WEST	0.46**	0.61***	1.13	-0.66
RURAL	-1.02***	-1.00***	0.62	-1.38**
Constant	-0.35	0.08	-8.91**	-1.24
R^2(c)	0.20	0.06	0.19	0.33
F(df)	(32,11180) =93.48***	(18,4025) =15.84***	(15,637) =11.03***	(17,2144) =66.07***

***Significant at one percent level
**Significant at five percent level
*Significant at ten percent level.

recommend it.) If medical subspecialists were more conservative in their adoption of these modalities, this could explain their constant physiotherapy rates over time.

Orthopedic surgeons, dermatologists and other medical specialists are the most likely to do physiotherapy of all physician specialties. As far as other physician characteristics go, we find board-certification and solo practice to be associated with lower rates of physiotherapy. Female physicians also do markedly less physiotherapy, at least in the medical subspecialties, like dermatology. Finally, older physicians are more likely to order physiotherapy, possibly as a complement to office surgery. (Older physicians also perform significantly more office surgery.)

Rates of physiotherapy are slightly higher in the West than in other parts of the nation, possibly due to Western physicians' greater willingness to try new types of treatment. Physiotherapy is also more common in urban areas, which may be both a function of greater equipment availability as well as faster service adoption.

5.6 Summary of Time Trends in Office Visit Content

Analysis of twelve dimensions of office visit content (length of visit, seven diagnostic, and four therapeutic services) has given us a comprehensive view of how physican office practice has changed from 1974 to 1981. At the same time, the sheer number of dimensions makes it difficult to summarize these time trends. Physicians are ordering some services more frequently than before, but others less often. What is the overall impact on visit intensity? In some instances, furthermore, positive intensity trends were observed for one specialty group but negative trends for another, without any effect on visits as a whole. Since some specialties are increasing their visit shares faster than others, historical trends may not be indicative of longer-run changes in treatment patterns.

5.6.1 Gross vs. Net Trends

Table 5-16 summarizes the gross and net time trends in all twelve visit content dimensions for the sample as a whole. Gross changes represent the simple annual time trend of length of visit (in minutes per year) or the physician's propensity to order a given service (percentage points per year). The net changes can be interpreted as the marginal impact of time on visit

TABLE 5-16

SUMMARY OF GROSS AND NET TIME TRENDS IN OFFICE VISIT CONTENT

	Gross Change[a]		Net Change[b]	
	Annual	1974-81[c]	Annual	1974-81[c]
Length of Visit (mins.)	0.13	0.91	0	0
General Exam (%)	-0.23	-1.61	-0.44	-3.08
Limited Exam (%)	2.59	18.13	2.68	18.76
Lab Tests (%)	0	0	0	0
X-Rays (%)	0	0	0	0
ECGs (%)	-0.08	-0.56	-0.12	-0.84
Vision Tests (%)	0.21	1.47	0	0
Pap Tests (%)	-0.27	-1.89	-0.26	-1.82
Office Surgery (%)	0.10	0.70	0	0
Counselling (%)	2.46	17.22	2.16	15.12
Family Planning (%)	0.18	1.26	0.18	1.26
Physiotherapy (%)	0.40	2.80	0.39	2.73

[a]Total change per year.
[b]Change per year, holding specialty, casemix, and other characteristics constant.
[c]Column gives annual change projected over seven years.

content, after all other factors have been accounted for, including shifts in casemix, specialty mix, and productivity. Where these after factors have not played a role in visit content, gross and net trends will be identical.

Overall, the nature of the average office visit has definitely changed. By 1981, the "typical" visit was nearly a minute longer than it was in 1974 (0.13*7=0.91). The physician was far more likely to conduct a limited exam while slightly less likely to do a general exam. The visit was longer, not because the physician was providing high-technology diagnostic services like ECGs or x-rays, but because he was performing more therapeutic services, especially "talking" therapies. The physician was just as apt to order a lab test and x-ray as he was in 1974, but actually less inclined to order an ECG or Pap test--at least on any one visit. The typical visit would be more likely to include medical and diet counselling, family planning, office surgery, and physiotherapy.

Thus, while the content of an office visit is changing, it is not changing in the way conventional wisdom would suggest. Physicians are not performing (or ordering) more tests, but rather more direct patient care services. Physicians may have reached an upper limit and already order lab tests or x-rays for all visits where appropriate (and hence our insignificant time trend for these two variables). Of course, one could argue that the number of lab tests and x-rays per visit is still increasing, and that we are just unable to observe any such trends with this data base. It is remarkable, however, that ECGs and Pap tests (where this problem of potentially multiple tests per visit presumably does not exist) are actually being prescribed less frequently as well.

Office visit content has changed in part because physicians themselves have changed. The average visit in 1981 is more likely to be made to a specialist than to a general practitioner, for example. Once we hold changing specialty mix and other patient, practice, and physician characteristics constant, a few of the time trends turn insignificant. In particular, there is no net change in length of visit, implying that the specialization trend (among others) explains why visit lengths are increasing. No time trend in casemix was found, further reinforcing this conclusion of a supply-side effect.

Positive time trends in vision tests and office surgery also become insignificant, once we hold specialty distribution constant. By 1981, for example, physicians were 23 percent more likely to perform a vision test during their office visits than they were in 1975 ((0.21*6)/5.38, the sample mean). Over the same time period, however, ophthalmologists increased their

relative share of office visits even more (a 29% increase, from 4.2% to 5.4% of all visits), and it is this shift which apparently explains the gross trend in vision tests. Declines in general exams and ECGs actually become larger, once we adjust for specialty shifts. Because specialists are more likely to provide these two services compared with general practitioners, and because their visit shares are growing over time, the gross trends are biased toward zero.

5.6.2 Specialty Time Trends

Of course, not all physicians are changing their office visit content in the same way. Rather, the time trends in Table 5-16 are a weighted average of positive, negative, and insignificant coefficients for the different specialty groups. Table 5-17 summarizes the net time trends for length of visit and the ancillary services by specialty. Only coefficients statistically significant at the 10 percent level or better are reported. Zero coefficients simply indicate that the time trend was not significant. (A dotted line means the equation was not estimated because the specialty rarely performed that service.)

Unlike physicians generally, primary care physicians are increasing visit lengths about 4 seconds/year, *ceteris paribus*. Practice patterns otherwise are generally comparable with those of the sample as a whole. Within the primary care sample, however, we observe considerable variation across specialty. Of particular interest for policy purposes are family practitioners; not only are they the fastest growing specialty (over a three-fold increase in office visit shares), but their treatment patterns are changing over time in different ways from those of other primary care physicians. Increasing visit lengths are primarily attributable to FPs, for example, who are spending a full 20 seconds more per patient every year, or almost 2 1/2 minutes more in 1981 than in 1974 (0.34*7 = 2.38). Like their primary care colleagues, FPs are performing more limited exams, more counselling and more physiotherapy, but unlike other physicians, FPs are not reducing their use of Pap tests, ECGs, and general exams. In part, these different trends undoubtedly reflect the fact that FPs themselves are changing. While similar to GPs in practice patterns at the beginning of the time-series, they resemble other primary care specialists by the end of the period, a transformation that undoubtedly reflects the increasing numbers of residency-trained FPs.

TABLE 5-17

SUMMARY OF NET TIME TRENDS IN OFFICE VISIT CONTENT BY SPECIALTY GROUP[a]

	LOV (mins)	General Exam (%)	Limited Exam (%)	Lab Tests (%)	X-rays (%)	ECGs (%)	Vision Test (%)	Pap Test (%)	Office Surgery (%)	Counsel-ling (%)	Family Planning (%)	Physio-therapy (%)
All Physicians	0	-0.44	2.68	0	0	-0.12	0	-0.26	0	2.16	0.17	0.39
Primary Care	0.06	-0.57	1.98	0	0	-0.16	0.09	-0.32	0.18	2.81	0.25	0.49
FPs	0.34	0	1.99	0	0	0	0	0	0	2.16	0	0.52
GPs	0	0	1.73	0	0	-0.14	0	-0.17	0	2.82	0.11	0.28
Internists	0	-0.67	0.82	-0.46	0	-0.47	0	-0.25	--	3.14	--	0.42
OB-GYNs	0	-1.56	2.13	-0.64	--	--	--	-0.73	0.27	4.52	1.33	0.24
Pediatricians	-0.13	-1.59	3.99	0.46	--	--	0	--	0.76	1.49	--	0.24
Medical Spec.	-0.24	0	2.07	0.40	-0.40	0	0	0	0	0.65	0	0
Surgical Spec.	0	-0.68	5.23	0	0.15	0	1.10	-0.11	0	0.88	0	0.46
Gen'l Surgeons	0.17	0.94	3.90	0	0	--	0	-0.30	0	1.38	--	0.54
Psychiatrists	-0.34	--	--	--	--	--	--	--	--	1.09	--	--

[a]All coefficients represent statistically significant trends (minutes per year, or percentage points per year), holding casemix, location, and physician characteristics constant.

While lab test utilization does not change for the sample as a whole, there are offsetting effects by specialty. Internists and OB-GYNs are actually ordering lab tests in fewer of their office visits, while pediatricians and medical specialists are ordering them more often. Lab tests are more likely to be ordered during those visits involving general exams, and thus we might expect declining lab test rates among those specialties that are performing fewer general exams over time. However, this cannot explain the growing propensity of pediatricians to order lab tests.

Somewhat surprisingly, the trend toward more in-office surgery is evident, not among general surgeons or even among general or family practitioners, but rather, it is OB-GYNs and pediatricians who are performing significantly more office surgery over time. This may help explain the declining visit lengths of pediatricians, given the type of simple surgery involved. Based on USC physician survey data,* we know that the most common office surgery performed by pediatricians involves sutures, dressings, and casts or splints. From our own NAMCS work, we also know that follow-up visits of this type (e.g., to remove sutures) are significantly shorter than other visits. By contrast, OB-GYN office surgery is considerably more complex (e.g., D and Cs, cauterization/cryotherapy), and increases over time may reflect a shift in the locus of treatment from hospital to office.

Medical specialists are shortening their visits at the relatively rapid rate of over 14 seconds per year. This is particularly surprising, since they are not cutting back on time-consuming services such as general exams and are actually doing more counselling (albeit a fairly low rate of increase, less than a percentage point per year, compared with over 3 percentage points annually for internists). Why this should occur is unclear, especially since we have held casemix constant. If this trend continues, it may provide a partial offset to increasing visit lengths among FPs. (The supply of both FPs and medical specialists is projected to increase through 1990.)

Surgical specialists are ordering more x-rays and providing more vision tests over time. Although we cannot test it directly due to small sample sizes, these trends appear to reflect changes in the visit content of orthopedic surgeons and ophthalmologists, respectively. Other trends, such as the substitution of limited for general exams and the increased use of physiotherapy, are consistent with those of physicians generally. Unlike surgical specialists as a whole, however, general surgeons are spending

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*See Table 3-6, Validation of NAMCS Using USC Survey Data, submitted under this contract, February 1983.

significantly more time with their office patients, 10 seconds more per year. These longer visits are apparently spent counselling more of their patients and performing more of both kinds of exams. General surgeons have been increasing the rate at which they perform general and limited exams by 6 percent per year ((0.94 + 3.90)/75.1, the average relative frequency of the two exam groups). Why are general surgeons changing the nature of their office visit? One explanation is that they may be entering the primary care market under competitive pressure of over-supply.

Finally, despite high absolute levels to start with (90%), psychiatrists are also counselling an increasingly larger share of their patients over time. Even so, they are spending less time with patients; psychiatrist visits are shortening at the rate of 20 seconds per year, or almost 2 1/2 minutes by 1981. This probably reflects the erosion of the "50-minute" psychotherapy hour to something closer to 45 minutes.

5.6.3 Physician and Practice Effects

Although our analysis has focussed on time trends, cross-sectional differences in how physicians treat patients are of interest in their own right. Table 5-18 summarizes the impact of selected physician and practice characteristics and geographic location on the various dimensions of office visit content. Coefficients are taken directly from the regression tables presented earlier, and represent the marginal impact (in minutes or percentage points) associated with the expanatory variable. Practicing in a rural area, for example, lowers average visit time by 1.17 minutes relative to an urban location, holding time, specialty, casemix, and other characteristics constant. In our analyses, casemix and physician age was specified in linear form (physician age sometimes included a squared term as well). For ease of presentation, we have calculated expected length of visit (or x-ray rates, etc.) at age 65 and contrasted them with expected visit length at the mean (49 years). The impacts in Table 5-18 are the difference of the two, e.g., the physician aged 65 spends almost two minutes more with his patients than does the physician of average age. Similarly, we have calculated the difference in length of visit and ancillary use between a practice of average casemix (1.05) and a practice with a more serious casemix, defined as a casemix score 10 percent above the mean.

Because data on DO characteristics (age, sex, board-certification status) were unavailable, all of the regressions shown earlier were based on MDs alone

TABLE 5-18

PATTERNS OF OFFICE VISIT CONTENT: PHYSICIAN CHARACTERISTICS AND GEOGRAPHIC LOCATION[a]

	LOV (mins)	General Exam (%)	Limited Exam (%)	Lab Tests (%)	X-rays (%)	ECGs (%)	Vision Test (%)	Pap Test (%)	Office Surgery (%)	Counsel-ling (%)	Family Planning (%)	Physio-therapy (%)
Female	2.22	4.71	0	7.24	0	0	0	3.03	0	8.32	0.54	0
Board-certified	0	0	0	1.54	0.61	0.40	0	0.77	0.90	1.53	0	-0.38
Age=65	1.83	0.31	0	0	-0.38	-0.17	-0.29	0.64	0.55	0	-0.48	0.64
Solo	0.36	0.64	-1.37	-2.85	-2.71	-0.67	-0.62	-0.99	-1.14	0	-0.29	-0.36
DO	0.62	0	-8.32	-3.28	0	-0.85	-0.90	-0.89	0	0	0	12.25
North East	1.16	3.90	-4.91	-3.06	-0.89	0	-0.40	0	0.81	0	0	0
South	1.19	1.69	-4.32	1.30	0.56	0.63	0	0	0	-2.58	-0.49	0
West	1.86	-1.79	-2.81	-1.36	0	0	-0.50	0	1.15	2.13	0	0.46
Rural	-1.17	-1.96	0	-0.65	-1.91	-1.20	-0.91	-0.32	0.38	0	0	-1.12
More Serious Casemix[b]	0.74	0.83	-0.44	0	0.32	0.36	0.21	0.30	-0.33	1.48	0	0

[a]All coefficients represent statistically significant marginal impacts (minutes, or percentage points) associated with the explanatory variable, holding time, specialty, casemix, and all other variables constant.

[b]Difference between average casemix and more serious casemix (10% above average).

(representing 95% of all visits). Similar regressions were also estimated for the entire sample (not shown), omitting these physician characteristics but including a dummy variable equal to one if the physician were a DO, and zero if an MD. The DO coefficients from these regressions are also summarized in Table 5-18. (This alternative specification did not produce any different parameter estimates from those based on the MD sample only.)

Women physicians (FEMALE) spend far more time with their patients, 2.22 minutes more on average compared with men physicians. Although previous studies have found similar differences (Langwell, 1982; Mitchell, 1982), they were unable to hold casemix constant. This analysis confirms that more serious diagnoses, or a differential mix of new and old patient visits, cannot explain the sexual difference in visit length. Does this mean that women physicians are providing a higher quality visit? Table 5-18 suggests this may in fact be the case. For the first time, we know what women physicians are doing during these longer office visits: They are providing more general exams, more counselling, and more family planning, all services expected to be time-consuming. In addition, women physicians are more likely to order lab tests and Pap tests than are their male colleagues. The magnitude of the male-female differences in ancillary use are considerable; women physicians perform Pap tests, for example, almost twice as often, in 7.8 percent of office visits on average vs. 4.8 percent of visits to men physicians. Furthermore, they order or provide the remaining diagnostic and therapeutic services just as frequently as men do.

By virtue of their training and credentials, we would expect board-certified physicians to provide more time- and service-intensive office visits compared with physicians who are not board-certified. At the same time, board-certified physicians may face a greater demand for their services and be more efficient clinicians, both of which would tend to shorten their visits. The net impact of these offsetting effects appears to be zero, as board-certified physicians do not spend any more time with their patients, even though they are significantly more likely to counsel them. Ancillary use is definitely more intensive, however; board-certified physicians order or perform lab tests, x-rays, ECGs, Pap tests, and office surgery far more frequently than other physicians.

The practice of older physicians is characterized by longer visits spent performing general exams and office surgery and less reliance on diagnostic testing. As the physician stock becomes younger (due to the tremendous influx of new graduates), we may find an increasing substitution of ancillary services for visit time.

It had been hypothesized that solo physicians would have longer, but less service-intensive, visits than those in group practice, as the latter may be better able to improve their productivity by substituting aide time and internalizing production of ancillaries. This in fact appears to be the case. Solo physicians spend 0.36 minutes more with their patients, apparently because they are apt to perform general instead of limited examinations. Most strikingly, physicians who practice alone order substantially fewer of all types of services compared with those in group practice. The differences, furthermore, are considerable, 13 percent fewer lab tests and 35 percent fewer x-rays, for example (based on the mean sample utilization rates of 21.7% and 7.7% for lab and x-rays, respectively). This is true even after specialty, casemix, physician age, and location have been held constant.

To our knowledge, this is the first time that practice styles of MDs and DOs have ever been compared using national data. The results in Table 5-18 show that the two types of physicians are indeed different; even holding casemix and specialty constant, DOs spend 0.62 minutes longer with their office patients than do MDs. These longer visits involve significantly fewer diagnostic services (except x-rays where there is no difference). Since DOs are just as apt to counsel patients as MDs, we can attribute their longer visits to the use of physiotherapy (in this instance, "manipulative therapy," the unique treatment modality performed by DOs). The physiotherapy coefficient implies that DOs provide that service in 16 percent of their office visits (based on the regression coefficient of 12.25), compared with only 3.7 percent of MD visits, *ceteris paribus*.

Compared to the North Central region (the omitted group), office visits are 1-2 minutes longer in the rest of the country. The content of those longer visits would appear to vary considerably across regions, however. Visits in the Northeast are longer because physicians perform more general exams and office surgery, while Western physicians do fewer exams of all types but spend more time in office surgery and in counselling their patients. In the South, on the other hand, the emphasis is on general exams involving a range of diagnostic services; Southern physicians provide more lab tests, x-rays, and ECGs than physicians anywhere else.

As expected, physicians in rural areas spend less time with patients on average, performing fewer general exams and fewer diagnostic services of all types. Despite their shorter visits (due presumably to higher workloads), rural physicians are just as likely as their urban colleagues to provide counselling and family planning services. Office surgery rates are actually

higher in these non-metropolitan areas, possibly because of the greater distances between office and hospital.

Physicians with a more serious casemix definitely provide more time- and service-intensive visits. They spend 0.74 minutes more per visit when patients are more seriously ill (as defined by a casemix score 10% above the mean). Physicians also are more likely to perform a general exam, to order more of all diagnostic services except lab tests, and to counsel their patients. Since office surgery includes many simple activities, such as removing sutures on otherwise well patients, it is not surprising that we observe a negative relationship with our casemix measure.

6.0 ANALYSIS OF TRACER VISITS

6.1 Objectives of Tracer Analysis

Earlier we saw that specialists' visits are much more time and service-intensive than those of GPs and that this difference persists over time. Of course, this is due in large part because these specialists treat a sicker patient population. Nevertheless, as specialists increasingly substitute for GPs in the delivery of primary care, their casemix should become less ill on average, thereby diminishing intensity increases somewhat over time. Tabular evidence presented in Chapter 4, however, showed that casemixes of the different specialties are quite stable over time, with no strong trends in either direction. How can we explain this apparent incongruity of falling GP visits over time with no simplifying impact on the casemixes of other primary care physicians? It is possible that our casemix index is too summary a measure to pick up any reallocation of certain visits from GP to primary care specialists. In addition, the index itself is based on visit length; if specialists provide longer visits for reasons unrelated to patient illness, our index will be biased upwards for those physicians. It is also possible that, by virtue of their training, specialists treat the same diagnosis differently than do GPs.

In order to examine these issues more closely, we selected ten "tracer" visits and compared treatment patterns within these tracers. We were concerned with the following types of questions:

(1) How has the specialty distribution treating a particular tracer changed over time?

(2) Has the tracer visit become more time-service intensive? Do certain tracers show much more dramatic changes in visit content than others?

(3) To what extent are shifts in specialty mix responsible for any intensity increases?

(4) How do specialties differ in their treatment of a given tracer, if at all?

6.2 Methodology

6.2.1 Selection of Tracers and File Construction

The tracer methodology was orginally developed as a means of evaluating the quality of the process of medical care (see Kessner, 1973). A diagnosis was selected (the tracer) in which the medical management was clearly

understood and where there was considerable agreement as to the appropriate procedures to be performed. Physician quality was then judged based on how closely their performance matched the expected (optimal) process of care. The advantage to using tracers is that the diagnostic categories are relatively homogeneous, and variation in treatment due solely to variations in the severity of illness can be minimized. For these reasons, tracers have been used in other types of health services research. Held and Manheim (1980) selected hypertension, for example, in their study of physician supply on costs and revisit rates. Similarly, Rosenblatt *et al.*, (1982) chose five diagnostic conditions in order to examine resource use by GPs and FPs in the USC survey.

Tracers were selected based on the following criteria:

(1) Representative of all age-sex groups - they should include conditions commonly found among children, young women, and the elderly, as well as the population generally.

(2) Adequate sample sizes - the tracer should be found in office visits in sufficient numbers to permit specialty-specific analysis within the tracer.

(3) Diagnosis/RFV mix - besides diagnoses which are commonly used as tracers, we wanted to construct some tracers based on the patient's reason for visit. Do different specialties respond differently to the same set of presenting symptoms? Do physicians respond more aggressively over time to these symptoms, e.g., order more diagnostic tests?

(4) Severity mix - the tracers should include both acute and chronic illnesses, as well as visits that are solely preventive in nature.

Using these criteria, we selected ten tracers: four based on the patient's reason for visit (stomach/abdominal pain, back problems, anxiety and nervousness, and headache), and six based on diagnosis (well baby, prenatal, hypertension, diabetes, otitis media, and chronic ischemic heart disease). A more complete definition of each tracer, along with its unweighted sample size, can be found in Table 6-1.

Unlike our other NAMCS work, the tracer analysis is based on the office visit as the unit of observation, rather than the physician. A separate file was constructed for each tracer. All analyses are weighted, using the original weight devised each year by NCHS.

TABLE 6-1

DEFINITIONS AND UNWEIGHTED SAMPLE SIZES FOR VISIT TRACERS

TRACER	DEFINITION	SAMPLE SIZE
Stomach Pain	Reason for Visit: Stomach (or abdominal) pain, cramps, or spasms	9,122
Back Problems	Reason for Visit: Back symptoms (including pain, cramps, stiffness, weakness, swelling, tumor), fractured spine, back sprain, whiplash	11,137
Anxiety	Reason for Visit: Anxiety and nervousness	6,671
Headache	Reason for Visit: Headache, including migraine	6,754
Well Baby	Diagnosis: Well baby visit, children under 5 years only	8,477
Prenatal	Diagnosis: Prenatal visit, includes normal and high risk pregnancy	14,231
Hypertension	Diagnosis: Essential benign hypertension	16,780
Diabetes	Diagnosis: Diabetes mellitus without complications	6,418
Otitis Media	Diagnosis: Acute and chronic otitis media	7,213
CIHD	Diagnosis: Chronic ischemic heart disease, including angina pectoris	9,128

6.2.2 Constructing the Intensity Index

The NAMC surveys provide information on multiple dimensions of office visit content, ranging from laboratory tests to office surgery. They do not, however, allow us to make simple comparisons of overall resource use across time or across specialties. We have no way of determining, for example, whether a hypertension visit including one ECG is more or less resource-intensive than a hypertension visit including lab tests. In order to make such comparisons, we used a summary "intensity index," developed for a similar purpose on another project.* This index attempts to capture the utilization of ancillary services in the office, both for diagnostic and therapeutic purposes.

An important methodologic issue arose in constructing such an index. How should the ancillary services be valued relative to one another? Is an ECG worth twice as much as an x-ray, for instance? Although the true value of each of these "products" is obviously difficult to measure, a common, albeit imperfect, approach (and the one we employed here) was to use their relative prices. Algebraically, our intensity index (I) can be expressed as the following:

$$(6.1) \qquad I_i = \frac{\sum_{j=1}^{8} \overline{AP}_j \cdot A_{ji}}{\sum_{j=1}^{8} \overline{AP}_j \cdot \overline{A}_j}$$

where $\overline{AP}_j$ is the mean price of the j^{th} ancillary; and A_{ji} signifies whether or not the j^{th} ancillary was provided during the i^{th} visit. (A_{ji} can only equal 0 or 1 for any individual visit.) The denominator represents the average value of the index for all physician visits in the United States. The index thus varies around the value one, with one representing the average intensity of an office visit provided by the average physician in the U.S.

*See Janet B. Mitchell and Jerry Cromwell, Alternative Methods of Describing Physicians Services Performed and Billed: Year 1 Report. Submitted to HCFA under Contract No. 500-81-0054, October 1982.

Prices for the ancillary services included in the index came from unpublished, national 1981 Medicare prevailing charge data.* For a number of ancillaries, charge data were available for more than one procedure e.g., six different kinds of x-rays, 14 lab tests, etc. In these cases, our ancillary prices represented a weighted average of charges for the various procedures. (Weights were based on the frequency of Medicare claims used to construct the prevailing in each charge locality, a reasonable proxy for total services provided.)

Table 6-2 presents each component of the intensity index along with its relative price (column 1). The first and second columns correspond to $\overline{AP_j}$ and $\overline{A_j}$, respectively, in eq. (6.1). The sum of their cross-products represents the denominator of eq. (6.1), a constant $12.34. Physicians who order more services than average, or a more expensive mix of services, would generate a visit with an implied ancillary value greater than $12.34, or an intensity index value greater than 1.0. The third column of Table 6-2 displays the relative values of each ancillary component of the index. An x-ray's contribution to the intensity index, for example, would be 4 1/2 times that of a lab test, 5.31 vs. 1.22.

It is important to realize that this index is based on end-period price weights. Comparable price data were not available for earlier years in the time-series, and so it was necessary to assume that relative prices were constant over time.

A second important dimension of office visit content is the length of physician-patient contact. Although physician time can also be valued and incorporated into the intensity index, we chose to analyze length of visit separately for two reasons. First, inter-specialty and temporal shifts in visit length are of policy interest in their own right. Second, physician time and ancillary use may be substitutes in the production of office visits; by analyzing them independently, we can determine whether certain specialties or physicians generally have altered the mix of their own time input and ancillaries over time.

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*These charge data were provided to our HCFA-funded project by the Office of Program Administration, HCFA. No charge data were available for drug prescriptions. The $5 used here represented average Medicare reimbursement for an injection in Michigan (based on 1981 claims data). A visit was considered to include a drug prescription, if any <u>one</u> of the various drug categories was reported.

TABLE 6-2

COMPONENTS OF THE INTENSITY INDEX AND THEIR RELATIVE PRICES

	1981 National Medicare Prevailing Charges	U.S. Average Visit Intensity[a] (1979 - 1980)	Relative Value Scale[b]
Endoscopy	$59.19	1.1%	11.84
X-ray	26.57	7.8	5.31
ECG	28.26	2.8	5.65
Pap Test	7.17	4.7	1.43
Lab Test	6.09	22.5	1.22
Office Surgery	23.43	7.4	4.69
Vision Test	26.16	5.8	5.23
Physiotherapy	19.01	4.1	3.80
Drug Prescription	5.00	61.8	1.00

[a]Percent of visits reporting a given ancillary procedure.

[b]Based on a drug prescription as the numeraire.

6.3 Descriptive Results

In this section, we present descriptive results separately for each of our ten tracers. First, we describe how the specialty mix treating the tracer condition has changed from 1974 to 1981. Then we show how the content of these visits has changed, along our dimensions of visit length, diagnostic and therapeutic services, and our summary intensity index measure. Finally, we re-examine changes in office visit content for the individual specialties most likely to treat that tracer. For ease of presentation, we limit this discussion to length of visit, the intensity index, and those ancillary services most frequently associated with the tracer.

6.3.1 Prenatal Care Visits

Not surprisingly, virtually all prenatal care visits are provided by three specialties: general practice, family practice, and OB-GYNs. As seen in Table 6-3, however, the allocation of these visits across specialties has changed considerably over time. General practitioners, who had one out of every four prenatal visits in 1974, provided only one out of ten by 1981. Family practitioners and OB-GYNs took up the slack, with the latter seeing over three quarters of all prenatal visits by the end of the time-series.

Although prenatal care visits have lengthened somewhat from 9.7 minutes in 1974 to 10.6 in 1981 (see bottom of Table 6-4), there has been little change in the overall service-intensity of those visits as measured by our index. In fact, few ancillary services are included in the typical prenatal visit; the intensity index value is only 0.45, relative to 1.0 for the average visit in the U.S. This is not surprising, as the higher priced services, such as x-rays, ECGs and office surgery, are almost never performed.

There has been considerable shift in the mix of general and limited exams, however, with physicians performing more limited and fewer general exams over time. Does this mean that physicians are providing a less comprehensive work-up of their pregnant patients? Probably not--instead it undoubtedly reflects a shift from new patient visits (usually requiring a general exam) to old patient visits. With increased per capita utilization, there are fewer new patient visits over time, relative to the number of follow-up visits. This shift may also explain the apparent (albeit) small declines in lab and Pap tests.

The large apparent increase in drug prescriptions from 1979 to 1980 is an artifact of the change in the survey instrument at that point. It should also

TABLE 6-3

CHANGES IN THE SPECIALTY MIX TREATING PRENATAL CARE OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	2.4	4.6	5.0	6.8	7.7	7.1	8.2	9.8
GPs	26.9	20.9	18.7	22.8	12.8	13.6	13.3	10.3
General Surgeons	0.9	1.0	0.8	0.6	0.6	0.4	0.2	0.4
Internists	0.4	0.2	0.2	0.0	0.4	0.3	0.2	0.6
OB-GYNs	66.8	72.1	74.0	69.5	77.9	78.1	76.1	77.6
Pediatricians	0.1	0.4	1.1	0.2	0.5	0.3	0.8	0.7
Allergists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cardiologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dermatologists	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Other medical specialists[a]	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Ophthalmologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthopedic Surgeons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Otolaryngologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Urologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other surgical specialists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Psychiatrists	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Other	2.4	0.8	0.1	0.0	0.0	0.1	1.2	0.6

[a]Includes neurologists

TABLE 6-4

CHANGES IN THE TREATMENT OF PRENATAL CARE OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	61.9	54.0	75.0	74.0	69.3	68.4	74.7
General History/Exam	--	14.1	13.6	13.6	17.8	9.5	8.8	9.0
Clinical Lab Test	32.5	57.9	60.4	54.5	52.3	52.3	52.9	51.2
X-ray	0.9	0.9	0.7	0.9	0.6	0.4	0.5	0.7
Blood Pressure Check	--	69.5	77.8	73.2	76.7	76.6	73.9	75.7
Pap Test	--	--	--	7.0	8.0	8.2	6.3	5.8
ECG	--	0.5	0.2	0.0	0.0	0.2	0.0	0.1
Vision Test	--	0.1	0.3	0.1	0.0	0.0	0.0	0.1
Endoscopy	--	0.1	0.2	0.0	0.3	0.7	0.0	0.1
Therapeutic Services								
Drugs	21.1	19.6	15.2	16.5	19.0	17.3	33.2	31.3
Office Surgery	--	0.5	0.3	0.3	2.0	0.9	1.0	0.5
Physiotherapy	--	0.0	0.0	0.0	0.1	0.1	1.9	0.2
All Counselling	--	11.3	8.8	34.7	36.8	27.6	31.0	32.6
Medical Counselling	--	10.8	8.4	23.8	27.2	22.1	21.6	22.4
Diet Counselling	--	--	--	13.9	15.1	9.2	11.9	14.7
Psychotherapy	1.8	0.6	1.1	3.8	4.5	0.7	2.2	0.7
Intensity Index	--	0.42	0.40	0.40	0.45	0.44	0.49	0.45
Length of Visit	9.7	10.0	10.0	10.7	10.9	10.8	11.2	10.6

be noted that the drug category includes nonprescription items as well; in this instance, most of the "drugs" are prenatal vitamin supplements. The percent of visits involving some sort of counselling increases dramatically over time, a trend observed for the sample as a whole in Chapter 3. By 1981, physicians report that they provide medical or diet advice to one out of every three prenatal patient visits.

Table 6-5 summarizes visit content trends for the three most common specialties along a few key dimensions. Although there is considerable variability from year to year, most time trends (e.g. longer visits) are consistent across specialties. Surprisingly, FPs appear to have somewhat more intensive visits than OB-GYNs, with an average index score of 0.50 in 1981 versus 0.45. They prescribe lab tests more frequently than OB-GYNs and also do more counselling. The latter may account for FPs' longer visits as well.

6.3.2 Well Baby Care Visits*

For well-baby care, most mothers go to pediatricians. Office visits to pediatricians make up approximately 80 percent of all office visits for well-baby care (Table 6-6). This percentage has remained relatively constant over time. In contrast, office visits to general practitioners for well-baby care have declined, with the gap being filled by family practitioners.

Physician time spent in well-baby visits has remained fairly constant over time, with a slight increase in 1980 and 1981 (Table 6-7). From Table 6-8, we see that, this is primarily due to increases in the length of office visits to general and family practitioners.

What else has been occurring in office visits for well-baby care? Looking first at diagnostic services (Table 6-7), we see that exams have grown over time to become a part of virtually every visit for well-baby care. In contrast to office visits for all patients (recall Table 3-1), well-baby visits are more likely to involve general exams than limited exams. However, physician practices regarding the kind of exam given have shifted over time. From 1975 to 1978, physicians increased the relative frequency of general exams and decreased the frequency of limited exams. However, from 1978 to 1981, they reversed this trend and provided more limited exams and fewer general exams.

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*We defined "well baby care" to include only children under five years of age.

TABLE 6-5

SPECIALTY DIFFERENCES IN THE TREATMENT OF PRENATAL CARE

	1974	1975	1976	1977	1978	1979	1980	1981
Clinical Lab Tests								
FPs	41.0	38.4	74.1	74.5	70.3	45.7	57.7	54.3
GPs	36.2	57.9	59.6	43.8	52.2	53.8	41.5	49.4
OB-GYNs	30.6	59.5	59.8	56.4	50.0	52.5	54.1	51.3
All Counselling								
FPs	--	16.9	9.9	52.7	38.0	31.0	44.9	41.8
GPs	--	16.3	6.2	27.6	31.4	37.6	35.9	17.5
OB-GYNs	--	8.6	9.2	35.9	38.0	25.5	28.5	33.4
Intensity Index								
FPs	--	0.35	0.49	0.48	0.44	0.28	0.54	0.50
GPs	--	0.48	0.45	0.34	0.52	0.47	0.44	0.39
OB-GYNs	--	0.40	0.39	0.42	0.43	0.45	0.49	0.45
Length of Visit								
FPs	7.8	9.4	7.9	9.6	12.2	10.6	11.7	11.2
GPs	10.0	10.2	10.1	9.8	11.1	12.4	12.1	11.1
OB-GYNs	9.6	9.9	10.0	11.1	10.7	10.5	10.9	10.4

TABLE 6-6

CHANGES IN THE SPECIALTY MIX TREATING WELL BABY CARE OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	2.0	4.9	3.3	4.3	8.9	7.2	8.2	12.1
GPs	17.3	19.4	12.7	14.7	16.4	7.7	9.6	5.9
General Surgeons	0.9	0.0	0.2	0.1	0.0	0.4	0.1	0.0
Internists	1.0	0.3	0.0	0.2	0.1	0.4	0.2	0.5
OB-GYNs	0.6	0.1	0.5	0.2	0.3	0.0	0.6	0.5
Pediatricians	75.4	74.9	83.1	80.3	74.4	83.2	80.1	79.2
Allergists	1.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Cardiologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dermatologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other medical specialists[a]	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ophthalmologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthopedic Surgeons	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Otolaryngologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Urologists	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other surgical specialists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Psychiatrists	0.6	0.0	0.0	0.0	0.0	1.1	0.1	0.0
Other	0.4	0.2	0.1	0.1	0.0	0.0	1.2	1.9

[a]Includes neurologists

TABLE 6-7

CHANGES IN THE TREATMENT OF WELL BABY CARE OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	20.5	18.0	16.9	15.5	32.2	39.3	41.9
General History/Exam	--	57.7	60.7	75.1	75.7	61.6	56.2	54.7
Clinical Lab Test	12.9	17.0	14.3	18.0	21.6	17.8	21.2	19.1
X-ray	0.2	0.7	0.4	0.6	0.6	0.3	0.3	0.1
Blood Pressure Check	--	4.5	5.3	4.4	5.8	6.0	5.7	4.6
Pap Test	--	--	--	0.2	0.0	0.0	0.1	0.0
ECG	--	0.0	0.2	0.2	0.3	0.0	0.0	0.1
Vision Test	--	3.6	3.4	2.5	2.0	3.9	3.0	2.9
Endoscopy	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Therapeutic Services								
Drugs	62.6	61.7	64.3	63.6	58.9	61.5	60.4	58.9
Office Surgery	--	0.2	0.3	0.1	2.0	1.2	9.5	6.5
Physiotherapy1	--	0.2	0.0	0.2	0.2	0.0	0.1	0.1
All Counselling	--	17.0	22.3	28.8	42.4	38.7	46.9	43.4
Medical Counselling	--	16.8	22.2	17.7	24.2	27.5	24.2	22.2
Diet Counselling	--	--	--	17.2	30.3	24.7	28.3	28.0
Psychotherapy	1.5	0.6	0.6	0.9	1.0	1.0	2.3	0.6
Intensity Index	--	0.43	0.42	0.42	0.45	0.45	0.60	0.52
Length of Visit	12.9	12.2	12.6	13.1	12.1	12.6	13.2	13.2

There appears to be some trend over time toward providing lab tests during a well baby visit, primarily on the part of pediatricians. It is striking that pediatricians prescribe lab tests in over one fifth of these visits, while FPs and GPs rarely do so.

Somewhat surprisingly for a prevention-oriented visit, few physicians test the vision of children under age five. Table 6-8 suggests that general and family practitioners have completely stopped giving vision tests, but pediatricians have not.

The therapeutic service most commonly provided by physicians to children under age five is drugs, primarily routine vaccinations and immunizations. Some form of drugs are administered or prescribed in six out of ten office visits, with virtually no difference by physician specialty.

Some form of counselling (presumably of the mothers or other caregivers) is becoming an increasing part of these office visits (Table 6-7). In contrast to office visits for the sample as a whole, diet counselling is a more frequent component of office visits for well-baby care than medical counselling generally. By 1981, diet counselling was provided in one out of every four visits. Although all three physician specialties have increased their rate of counselling, pediatricians and FPs show the most dramatic increase. Nearly half of well-baby visits to these two specialties for well-baby care now involve some type of counselling.

Our summary measure of service intensity has risen over time for well-baby care, particularly in 1980 and 1981. This is due at least in part to the substantial rise in office surgery during those two years, an increase shared by pediatricians alone (not shown). Why this should have occurred remains unexplained.

6.3.3 Otitis Media Visits

Otitis media is an inner ear ailment which most commonly affects children. A number of important shifts have occurred in the types of physicians treating this condition (Table 6-9). Pediatricians provide about one-half of otitis media visits and their share has been increasing over time. The GP-FP mix has changed as it has for the previous tracers we've seen, with the increase in FP visits almost perfectly offsetting the decline in GP visits. Most surprising is the decrease in visits to otolaryngologists (ear, nose, and throat specialists). Otitis media visits to otolaryngologists dropped from 22.4 percent in 1974 to 13.6 percent in 1981. Specialist-GP or FP-GP substitution appears quite common in our tracers, but here we also observe the

TABLE 6-8

SPECIALTY DIFFERENCES IN THE TREATMENT OF WELL BABY CARE

	1974	1975	1976	1977	1978	1979	1980	1981
Clinical Lab Tests								
FPs	21.4	16.4	8.6	3.8	7.3	9.5	19.6	8.8
GPs	5.4	13.1	9.6	9.4	7.9	7.9	10.1	3.2
Pediatricians	14.6	18.3	15.6	20.5	26.4	19.4	22.6	22.0
Vision Test								
FPs	--	3.3	5.1	0.0	0.0	0.0	1.4	0.0
GPs	--	3.6	3.5	1.4	1.3	1.5	0.0	0.0
Pediatricians	--	3.7	3.1	2.8	2.4	4.3	3.3	3.7
Drugs								
FPs	35.6	63.8	57.2	61.6	58.4	52.4	54.2	59.7
GPs	66.4	57.6	58.8	66.8	58.6	63.7	56.0	58.9
Pediatricians	62.1	62.6	65.5	63.1	59.1	61.9	61.4	59.0
All Counselling								
FPs	--	7.2	2.2	44.4	43.3	23.0	42.2	48.2
GPs	--	11.2	7.5	22.9	24.0	31.6	38.8	25.9
Pediatricians	--	19.3	25.6	29.2	46.2	41.0	48.8	45.1
Intensity Index								
FPs	--	0.41	0.39	0.27	0.27	0.26	0.48	0.40
GPs	--	0.40	0.36	0.40	0.30	0.33	0.32	0.26
Pediatricians	--	0.45	0.43	0.43	0.50	0.47	0.64	0.56
Length of Visit								
FPs	10.6	10.0	10.6	7.6	11.0	12.6	12.0	12.2
GPs	9.2	10.5	10.9	10.3	11.0	12.2	12.7	11.3
Pediatricians	13.6	12.8	13.0	13.9	12.4	12.7	13.3	13.4

TABLE 6-9

CHANGES IN THE SPECIALTY MIX TREATING OTITIS MEDIA OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	3.2	4.8	5.9	8.4	8.9	9.4	9.8	14.4
GPs	24.1	25.9	25.6	20.1	16.7	20.6	13.8	11.4
General Surgeons	1.0	2.5	1.0	0.3	1.0	1.1	0.7	0.5
Internists	1.6	3.5	1.5	2.0	1.5	2.1	2.1	1.8
OB-GYNs	0.3	0.8	0.4	0.0	0.3	0.0	0.1	0.1
Pediatricians	43.4	38.2	51.1	45.9	49.3	55.2	51.1	56.5
Allergists	0.8	0.6	0.7	0.2	0.0	0.2	0.0	0.1
Cardiologists	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Dermatologists	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other medical specialists[a]	0.3	0.0	0.0	0.2	0.2	0.1	0.0	0.0
Ophthalmologists	1.5	1.1	0.1	1.7	0.0	0.3	1.3	0.0
Orthopedic Surgeons	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0
Otolaryngologists	22.4	20.5	13.3	20.7	22.3	9.9	18.8	13.6
Urologists	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Other surgical specialists	0.1	0.4	0.1	0.3	0.0	0.0	0.0	0.1
Psychiatrists	0.6	0.9	0.0	0.3	0.0	0.0	0.3	0.0
Other	0.4	1.9	0.2	0.0	0.0	0.9	1.8	1.3

[a]Includes neurologists

substitution of one group of specialists (pediatricians) for another (ENT specialists).

The length of office visits for otitis media have remained fairly constant at 11 minutes from 1974 to 1981 (see Table 6-10). As might be expected, limited exams are far more common for patients with otitis media than are general exams (Table 6-10). While the frequency of general exams has remained about the same, the frequency of limited exams has risen. As a result, almost all patients with otitis media now receive some type of physicial exam and history.

The only other diagnostic services provided with any frequency for otitis media are lab tests. Although the rate has fluctuated from year to year, no trend is apparent. Table 6-11 indicates, however, that pediatricians order lab tests more frequently than other physicians and that otolaryngologists order them less frequently.

Otitis media is treated primarily with drugs (Table 6-10), a regimen which has increased slightly in frequency in recent years for all specialties, as seen in Table 6-11. General practitioners utilize drugs in their treatment of otitis media far more than other physicians. Otolaryngologists prescribe drugs less often, choosing instead to perform some sort of office surgery. Rates of surgical treatment appear to be declining over time, however. Counselling appears to be a far more common therapeutic service for otitis media than office surgery, although time trends are difficult to observe because of year to year fluctuations.

The intensity index has remained fairly constant for otitis media over time. Slight declines in the last two years may reflect less use of office surgery.

6.3.4 Hypertension Visits

Until 1981, more patients with hypertension were seen by general practitioners than were seen by any other type of physician (see Table 6-12). Not until then was a hypertension patient as likely to see an internist as a GP. Office visits to family practitioners have been rising at the most rapid rate. Surprisingly few office visits for hypertension are to cardiologists, less than four percent, with no real changes over time; in fact, general surgeons see more patients for hypertension than do cardiologists.

The length of office visits for hypertension has clearly increased, about 9 percent, as seen in Table 6-13. Have office visits for hypertension lengthened because physicians are providing more services? We would expect that the first thing a physician would do for a patient with hypertension

TABLE 6-10

CHANGES IN THE TREATMENT OF OTITIS MEDIA OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	64.4	65.9	75.0	76.7	85.2	82.5	78.6
General History/Exam	--	14.0	12.9	17.2	19.1	10.7	12.6	15.6
Clinical Lab Test	12.9	6.2	7.4	7.0	5.6	11.9	7.3	8.6
X-ray	0.7	1.8	1.0	1.3	1.6	0.8	0.8	1.0
Blood Pressure Check	--	6.0	7.1	6.3	6.4	9.5	5.8	7.2
Pap Test	--	--	--	0.3	0.0	0.3	0.0	0.1
ECG	--	0.4	0.4	0.1	0.0	0.0	0.2	0.3
Vision Test	--	0.2	0.2	0.1	0.1	0.3	0.2	0.4
Endoscopy	--	0.5	0.0	0.1	0.1	0.1	0.0	0.1
Therapeutic Services								
Drugs	77.9	81.0	73.8	79.5	78.1	82.5	80.8	83.3
Office Surgery	--	4.3	5.8	5.1	5.2	4.6	3.0	2.5
Physiotherapy	--	0.0	0.6	0.1	0.0	0.3	0.9	0.3
All Counselling	--	11.1	7.1	21.1	19.0	14.5	31.2	19.8
Medical Counselling	--	11.1	6.7	19.9	18.5	13.6	29.3	17.6
Diet Counselling	--	--	--	1.5	2.3	1.8	2.3	2.0
Psychotherapy	1.9	2.5	0.5	0.4	0.2	0.2	0.9	0.6
Intensity Index	--	0.52	0.49	0.49	0.51	0.55	0.46	0.48
Length of Visit	11.2	10.8	10.6	10.9	11.0	10.5	11.4	11.5

TABLE 6-11

SPECIALTY DIFFERENCES IN THE TREATMENT OF OTITIS MEDIA

	1974	1975	1976	1977	1978	1979	1980	1981
Clinical Lab Tests								
FPs	11.2	2.0	10.8	9.1	10.7	7.1	8.9	6.8
GPs	9.0	7.9	9.3	4.6	4.8	25.1	2.4	6.7
Pediatricians	18.8	7.9	7.4	9.9	6.5	9.4	10.5	10.9
Otolaryngologists	6.1	2.3	1.2	2.2	1.8	0.4	2.5	1.1
Drugs								
FPs	84.4	85.5	92.8	93.2	92.9	88.9	86.6	88.1
GPs	88.3	89.5	83.2	90.7	90.4	94.8	93.3	92.9
Pediatricians	84.8	82.8	70.6	81.3	82.4	82.2	86.2	87.3
Otolaryngologists	48.8	65.6	56.2	57.6	52.9	55.4	56.7	51.7
Office Surgery								
FPs	--	0.2	0.0	1.7	0.0	9.3	2.8	10.6
GPs	--	0.0	0.7	0.2	3.9	1.7	2.6	3.0
Pediatrician	--	2.1	7.5	0.7	0.8	2.2	1.7	1.6
Otolaryngologists	--	15.1	11.3	18.3	18.0	16.8	7.3	7.9
Intensity Index								
FPs	--	0.36	0.48	0.46	0.57	0.74	0.52	0.44
GPs	--	0.53	0.45	0.40	0.49	0.71	0.52	0.49
Pediatricians	--	0.46	0.49	0.40	0.45	0.44	0.45	0.48
Otolaryngologists	--	0.65	0.48	0.66	0.64	0.58	0.40	0.39
Length of Visit								
FPs	6.4	9.2	8.8	8.5	9.4	10.8	10.7	10.5
GPs	9.2	9.0	10.0	10.3	10.9	8.9	10.0	10.4
Pediatricians	11.0	10.3	10.0	10.7	10.1	9.8	11.3	11.7
Otolaryngologists	13.8	13.6	13.3	12.9	13.6	14.8	12.5	12.2

TABLE 6-12

CHANGES IN THE SPECIALTY MIX TREATING HYPERTENSION OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	4.2	8.4	8.2	13.3	12.3	11.8	13.2	19.9
GPs	54.9	52.7	48.7	45.6	43.9	45.5	42.3	33.5
General Surgeons	4.6	5.5	4.1	4.0	2.6	4.7	1.4	4.1
Internists	27.2	25.3	30.0	30.0	33.6	29.0	31.1	34.6
OB-GYNs	1.0	1.5	1.3	1.2	1.4	0.6	2.2	1.6
Pediatricians	0.2	0.1	0.4	0.1	0.2	0.4	0.0	0.1
Allergists	0.5	0.1	0.1	0.9	0.0	0.0	0.6	0.4
Cardiologists	2.0	3.9	2.6	2.0	3.6	3.6	3.0	3.3
Dermatologists	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
Other medical specialists[a]	2.0	1.0	1.2	1.2	1.8	1.3	1.4	1.8
Ophthalmologists	0.3	0.1	0.8	0.3	0.1	0.0	0.1	0.1
Orthopedic Surgeons	0.0	0.0	0.9	0.2	0.0	0.1	0.2	0.0
Otolaryngologists	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Urologists	0.2	0.2	0.1	0.4	0.1	0.1	0.0	0.0
Other surgical specialists	0.2	0.0	0.1	0.0	0.0	0.2	0.2	0.0
Psychiatrists	0.2	0.0	0.2	0.0	0.1	0.1	0.0	0.6
Other	2.5	1.3	1.4	0.6	0.4	2.7	4.1	0.8

[a]Includes neurologists

TABLE 6-13

CHANGES IN THE TREATMENT OF HYPERTENSION OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	54.0	55.7	58.1	59.2	62.7	59.6	57.5
General History/Exam	--	12.6	13.1	19.9	22.1	14.5	14.5	12.3
Clinical Lab Test	19.0	22.2	19.0	16.8	19.7	22.6	20.7	21.9
X-ray	4.1	4.5	4.9	6.7	6.5	5.1	5.1	5.8
Blood Pressure Check	--	81.4	78.4	81.8	85.1	86.5	85.4	86.2
Pap Test	--	--	--	2.5	2.6	2.8	1.6	2.3
ECG	--	7.7	7.7	7.7	8.3	7.1	7.8	7.6
Vision Test	--	1.0	1.1	0.9	1.8	0.8	0.8	0.7
Endoscopy	--	0.4	0.5	1.3	1.5	0.7	0.5	0.4
Therapeutic Services								
Drugs	79.2	66.8	63.3	79.9	79.8	80.5	88.6	87.7
Office Surgery	--	0.5	0.4	0.5	0.7	0.3	0.9	0.5
Physiotherapy	--	0.1	0.3	0.5	0.9	0.4	1.4	1.0
All Counselling	--	15.7	16.2	38.9	35.1	34.7	43.2	42.1
Medical Counselling	--	14.1	15.1	26.1	23.6	25.7	26.8	27.8
Diet Counselling	--	--	--	16.9	16.6	14.2	21.7	19.4
Psychotherapy	3.1	2.0	1.9	3.1	3.2	2.0	3.7	3.2
Intensity Index	--	0.71	0.69	0.84	0.90	0.79	0.84	0.84
Length of Visit	13.7	13.6	14.3	14.8	14.6	14.3	15.0	15.0

would be to check the patient's blood pressure. Table 6-13 indicates that, while the percentage of office visits involving blood pressure checks has increased somewhat, blood pressures were not checked in over 13 percent of hypertension visits. One possible explanation is that the blood pressures of these patients were taken as part of a limited or general exam and hence were not recorded separately.

Lab tests are provided in one out of five office visits for hypertension, a proportion that has remained fairly constant over time. Breaking down the frequency of lab tests by physician specialty (Table 6-14) does reveal some differences. General practitioners prescribe lab tests least, and internists most often, with no substantial changes over time. FPs, on the other hand, have dramatically increased their reliance on lab tests for hypertension. In 1974, FPs resembled their GP colleagues in lab use, while by 1981 they had achieved the same lab utilization rates as internists.

ECGs are provided in 7-8 percent of hypertension visits, a rate that has remained very steady from 1975 to 1981. This is true for each type of physician as well (Table 6-14), although absolute levels for internists are five times higher than those for either FPs or GPs. Although less frequent than ECGs, x-rays increased in frequency until 1977 and then have decreased somewhat (Table 6-13).

Turning to therapeutic services, we find much greater changes in visit content. As can be seen in Table 6-13, medications are the principal means of treating hypertension. Their use has been increasing steadily, from 79 percent of all visits in 1974 to 88 percent in 1981. Table 6-14 indicates that until recently GPs have relied more heavily on medications than other physicians. While GPs have increased their drug prescription rate considerably, internists and FPs have increased their use even more. As a result by 1980, all three specialties made equal use of drugs in treating hypertension.

Physicians in all specialties are doing more counselling of their hypertension patients; by 1981, over 40 percent of visits involved some type of medical, diet, or social counselling. This trend is undoubtedly a factor in the longer visit times noted earlier. Again we note the tendency of FPs to resemble GPs at the beginning of the time series and to be more like internists in their prescribing behavior at the end.

Average visit intensity increased about 18 percent over time, as measured by our intensity index. This is probably an underestimate of visit content changes, since non-priced services such as counselling (which increased markedly) are not included in our index.

TABLE 6-14

SPECIALTY DIFFERENCES IN THE TREATMENT OF HYPERTENSION

	1974	1975	1976	1977	1978	1979	1980	1981
Clinical Lab Tests								
FPs	17.4	18.3	16.8	18.1	17.4	25.4	20.9	29.4
GPs	16.0	17.7	16.4	12.0	14.1	18.5	16.8	13.6
Internists	24.0	34.3	23.8	23.0	25.8	29.0	26.2	27.1
ECG								
FPs	--	3.3	3.2	5.2	2.6	3.1	4.0	3.3
GPs	--	3.8	3.9	3.4	3.1	3.5	3.5	2.4
Internists	--	17.1	13.4	15.4	16.1	13.2	13.2	15.6
Drugs								
FPs	80.7	61.6	61.2	80.1	76.8	85.3	88.3	86.5
GPs	83.4	71.6	71.8	85.4	84.8	84.9	89.0	88.1
Internists	70.9	58.9	55.4	73.9	75.8	72.2	87.1	90.2
All Counselling								
FPs	--	13.5	21.2	41.7	44.2	36.3	43.5	50.2
GPs	--	13.6	12.5	29.8	30.3	34.2	40.0	36.1
Internists	--	20.8	20.7	52.1	41.9	34.7	46.4	44.1
Intensity Index								
FPs	--	0.62	0.59	0.66	0.62	0.64	0.68	0.74
GPs	--	0.56	0.57	0.61	0.63	0.63	0.68	0.58
Internists	--	1.07	0.82	1.29	1.33	1.06	1.03	1.17
Length of Visit								
FPs	11.1	10.1	11.8	10.2	12.3	12.4	12.3	13.2
GPs	12.1	12.1	12.0	13.5	12.6	12.5	12.5	13.0
Internists	16.8	17.9	17.9	18.5	17.4	17.2	19.0	17.9

6.3.5 Chronic Ischemic Heart Disease Visits

As with other tracers, office visits to GPs have dropped as a percentage of all office visits for chronic ischemic heart disease (CIHD), from 43.3 percent in 1974 to 22.6 percent in 1981 (see Table 6-15). While internists have replaced GPs as the physician specialty most frequently seen by CIHD patients, their visit share has increased only modestly. The most dramatic change has been among cardiologists whose office visit share increased almost four-fold, from 5.7 percent in 1974 to 19.8 percent in 1981.

The average length of office visits for CIHD grew over 16 percent from 1974 to 1981 (see Table 6-16). Table 6-17 indicates that this is due both to longer visits over time to internists and FPs, and to the substitution of cardiologists (with their very long visits) for GPs. Surprisingly, however, cardiologists do not appear to have lengthened their visits over our time-series. Although office visits to cardiologists remain substantially longer than those to internists over time, there is virtually no difference by 1981. If present trends continue, office visits to internists may eventually surpass those to cardiologists in length.

The Intensity Index has also clearly increased over time for CIHD visits (see Table 6-16), primarily because of greater reliance on drugs, ECGs, and possibly on x-rays as well. Increases in service intensity are most apparent in office visits to internists (see Table 6-17). However, office visits to cardiologists remain the most service intensive, while GP office visits have generally been the least intensive.

The most frequent diagnostic service ordered or performed in a CIHD visit is a blood pressure check (see Table 6-16). However, the frequency has been declining over time, from 76.5 percent in 1975 to 68.8 percent in 1981. Second in frequency is a limited physical exam and history; these occur in approximately two out of three CIHD visits, a rate that has been relatively stable over time.

Electrocardiograms show a marked increase over time, rising from 24.0 percent in 1976 and 1977 to 29.6 percent in 1981. Table 2-17 indicates that cardiologists utilize ECGs much more heavily than other physicians do; cardiologists order or perform an ECG in one of every two CIHD visits, a rate that has remained constant over time. Internists, however, have been increasing their use of ECGs and, if present trends continue, their use should soon equal that of cardiologists.

TABLE 6-15

CHANGES IN THE SPECIALTY MIX TREATING CHRONIC ISCHEMIC HEART DISEASE OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	5.8	6.3	6.8	14.9	13.6	9.4	15.3	9.8
GPs	43.3	35.4	44.9	29.8	22.3	29.7	20.6	22.6
General Surgeons	3.2	2.4	0.9	2.6	2.3	1.0	1.2	2.0
Internists	37.3	37.9	37.9	38.6	39.5	37.7	39.9	40.3
OB-GYNs	0.2	0.0	0.1	0.2	0.1	0.0	0.3	0.2
Pediatricians	0.2	0.1	0.0	0.1	0.0	0.1	0.0	0.0
Allergists	0.0	0.1	0.0	0.1	0.2	0.0	0.5	0.8
Cardiologists	5.7	14.0	7.1	11.4	17.3	18.6	15.3	19.8
Dermatologists	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Other medical specialists[a]	1.9	1.3	1.0	0.7	3.4	1.2	2.4	1.0
Ophthalmologists	1.0	0.5	0.6	0.2	0.2	0.3	1.5	0.5
Orthopedic Surgeons	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.0
Otolaryngologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Urologists	0.2	0.0	0.1	0.9	0.0	0.2	0.0	0.0
Other surgical specialists	0.4	0.3	0.3	0.5	1.2	0.1	2.3	2.6
Psychiatrists	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.3
Other	1.8	2.1	0.7	0.2	0.2	1.9	2.1	0.6

[a]Includes neurologists

TABLE 6-16

CHANGES IN THE TREATMENT OF CHRONIC ISCHEMIC HEART DISEASE OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	66.3	60.6	59.0	63.2	67.9	60.9	65.4
General History/Exam	--	14.2	18.5	26.1	24.1	17.0	19.0	15.1
Clinical Lab Test	34.4	25.7	26.1	24.2	27.0	25.3	22.4	22.0
X-ray	8.1	6.7	7.3	8.5	14.3	9.8	9.8	8.9
Blood Pressure Check	--	76.5	76.4	75.0	70.9	76.6	68.4	68.8
Pap Test	--	--	--	1.3	0.7	2.0	0.8	0.7
ECG	--	24.5	24.0	24.0	26.5	24.5	29.5	29.6
Vision Test	--	0.8	0.5	0.8	0.2	1.2	0.4	0.5
Endoscopy	--	0.7	0.6	0.7	0.6	1.5	0.6	0.4
Therapeutic Services								
Drugs	75.4	60.8	61.2	76.0	72.1	75.1	86.7	84.5
Office Surgery	--	0.6	0.4	0.8	0.6	0.8	0.0	0.9
Physiotherapy	--	0.2	0.8	0.6	0.7	0.5	1.2	0.2
All Counselling	--	20.2	20.5	45.8	40.8	45.8	43.0	47.9
Medical Counselling	--	17.3	19.3	38.9	32.1	40.6	34.4	40.5
Diet Counselling	--	--	--	14.3	15.5	11.2	13.9	14.0
Psychotherapy	2.4	4.0	2.3	3.8	2.8	1.7	3.2	4.2
Intensity Index	--	1.15	1.14	1.25	1.40	1.34	1.41	1.38
Length of Visit	16.0	16.7	17.0	16.9	17.2	17.1	18.2	18.6

TABLE 6-17

SPECIALTY DIFFERENCES IN THE TREATMENT OF CHRONIC ISCHEMIC HEART DISEASE

	1974	1975	1976	1977	1978	1979	1980	1981
Clinical Lab Tests								
FPs	28.1	24.0	26.3	24.8	21.1	26.4	19.6	32.1
GPs	24.5	17.1	27.3	20.2	21.7	23.2	11.0	15.2
Internists	42.4	38.4	25.8	27.0	26.0	31.2	24.9	27.1
Cardiologists	30.2	10.5	11.3	8.8	23.1	9.4	17.0	13.1
X-Ray								
FPs	3.0	8.9	3.4	4.8	7.2	1.9	6.7	6.3
GPs	4.2	2.2	5.0	5.2	7.8	12.1	2.8	5.0
Internists	9.7	8.6	9.7	13.2	13.7	9.4	12.5	11.1
Cardiologists	30.2	10.5	11.3	8.8	23.1	9.4	17.0	13.1
ECG								
FPs	--	13.5	18.2	17.8	14.0	15.3	17.3	16.5
GPs	--	8.6	14.2	12.6	10.9	13.9	14.4	11.7
Internists	--	28.9	30.6	31.4	26.7	32.6	31.1	36.9
Cardiologists	--	57.8	55.9	45.9	54.7	28.8	55.4	48.1
Drugs								
FPs	76.5	53.5	65.7	82.0	69.2	79.3	84.5	76.5
GPs	82.6	75.2	68.6	79.6	83.7	75.4	90.6	84.6
Internists	69.3	55.7	58.5	73.6	72.6	78.4	88.8	89.2
Cardiologists	62.4	34.6	29.1	62.4	59.8	66.3	76.5	81.1
All Counselling								
FPs	--	39.3	21.2	54.0	54.5	41.5	53.7	57.2
GPs	--	23.0	16.5	38.8	27.4	38.5	32.5	33.6
Internists	--	19.6	21.7	48.6	45.1	50.3	43.4	51.4
Cardiologists	--	8.7	34.3	50.2	32.8	48.6	29.9	48.3
Intensity Index								
FPs	--	0.97	0.94	1.06	0.90	0.93	1.05	1.03
GPs	--	0.70	0.89	0.90	0.93	1.09	0.83	0.93
Internists	--	1.32	1.35	1.54	1.42	1.62	1.52	1.63
Cardiologists	--	1.89	1.76	1.70	2.22	1.33	2.23	1.83
Length of Visit								
FPs	11.9	13.3	14.1	10.8	14.7	14.1	12.2	15.4
GPs	14.1	13.5	14.6	14.5	14.1	13.8	14.5	13.9
Internists	17.7	18.8	18.4	19.6	19.4	18.3	20.0	20.8
Cardiologists	26.4	20.7	24.9	21.6	19.1	21.2	23.3	21.7

In contrast, lab tests have declined by a third, from 34.4 percent in 1974 to 22.0 percent in 1981 (see Table 6-16), a trend shared by all specialties except FPs. The use of x-rays in CIHD visits appears to have grown, on the other hand, particularly among FPs and internists. Absolute levels remain highest for cardiologists.

As we might expect, given advances in drug therapies, the use of drugs in CIHD has increased rapidly from 60.8 percent of all visits in 1975 to 84.5 percent in 1981. While the frequency of diet counselling in CIHD visits has remained about the same since 1977, medical counselling has tripled since 1975. By 1981, one out of every two CIHD visits involved some form of counselling. This undoubtedly reflects the growing awareness of the importance of factors, such as exercise and stress, in heart disease.

6.3.6 Diabetes Visits

As with most of the other tracers, patients with diabetes have shifted over time away from GPs and toward internists and FPs (see Table 6-18). In 1974, office visits to GPs accounted for one-half of all office visits for diabetes; by 1981, they accounted for only a third. In contrast, office visits to internists rose from 29.4 percent of diabetes visits in 1974 to 36.2 percent in 1981, while office visits to FPs climbed from 6.1 percent to 17.5 percent during the same period.

There appears to be little change over time in the average length of office visits for diabetes, either for the sample as a whole (see Table 6-19) or by physician specialty (see Table 6-20). The average intensity of those visits has increased somewhat, however, especially among FPs.

The most frequent diagnostic services ordered or performed in office visits for diabetes are lab tests and blood pressure checks; these are ordered or performed in two-thirds of all office visits for diabetes. While the frequency of a blood pressure check has remained about the same over time, lab test use appears to have decreased since 1975, a trend which appears most marked for internists. One explanation may be higher visit rates, which would reduce the need to check patients' urine on every visit.

Drugs and counselling are the chief therapeutic services provided by physicians in office visits for diabetes (see Table 6-19). The very large increase in drug prescriptions in 1980 and 1981 is probably an artifact of the change in the questionnaire at this time. By 1981, over one-half of all diabetes visits invoved some from of counselling. This was most likely to be

TABLE 6-18

CHANGES IN THE SPECIALTY MIX TREATING DIABETES OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	6.1	6.3	12.6	17.7	13.9	13.9	15.3	17.5
GPs	50.3	52.8	46.6	36.4	37.8	40.9	36.4	33.3
General Surgeons	4.0	3.4	1.5	3.1	4.0	2.3	1.5	2.4
Internists	29.4	29.4	31.7	27.8	34.9	32.6	32.4	36.2
OB-GYNs	0.4	0.6	0.6	0.6	0.3	0.1	1.0	0.8
Pediatricians	1.1	0.7	1.4	0.8	1.3	0.4	1.0	0.6
Allergists	0.0	0.0	0.0	0.5	0.0	0.0	0.5	0.3
Cardiologists	1.4	2.2	2.3	1.7	2.9	2.4	1.4	2.1
Dermatologists	0.0	0.0	0.0	0 0	0.0	0.0	0.0	0.0
Other medical specialists[a]	2.2	1.0	0.4	7.0	1.8	1.0	0.5	3.0
Ophthalmologists	0.9	2.3	1.9	3.0	2.3	2.7	4.8	2.4
Orthopedic Surgeons	0.1	0.3	0.0	0.4	0.1	1.0	0.8	0.4
Otolaryngologists	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0
Urologists	0.4	0.1	0.3	0.1	0.1	0.8	0.0	0.3
Other surgical specialists	0.1	0.0	0.2	0.0	0.0	0.0	0.2	0.2
Psychiatrists	0.7	0.0	0.0	0.0	0.3	0.0	0.0	0.2
Other	3.0	1.1	0.6	0.4	0.2	2.1	4.2	0.2

[a]Includes neurologists

TABLE 6-19

CHANGES IN THE TREATMENT OF DIABETES OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	51.6	55.8	53.1	59.8	61.6	58.8	56.0
General History/Exam	--	15.4	17.3	22.5	21.2	15.5	11.9	15.7
Clinical Lab Test	60.7	72.5	70.7	69.4	67.4	69.0	63.8	66.3
X-ray	2.8	3.9	3.5	3.4	3.0	4.7	3.8	3.3
Blood Pressure Check	--	67.0	66.6	67.1	65.2	64.4	62.4	65.0
Pap Test	--	--	--	1.0	2.3	1.4	0.6	1.2
ECG	--	5.9	5.6	4.8	7.7	4.1	4.6	4.9
Vision Test	--	3.1	3.3	2.8	4.2	3.2	5.9	3.2
Endoscopy	--	0.5	0.7	0.6	1.1	0.8	0.4	0.5
Therapeutic Services								
Drugs	65.5	52.9	52.3	63.8	61.7	58.6	79.5	74.6
Office Surgery	--	0.9	1.2	1.2	1.0	1.7	1.2	1.2
Physiotherapy	--	0.4	0.3	0.3	0.5	0.1	0.4	0.8
All Counselling	--	22.4	22.8	56.3	48.7	53.6	55.3	55.6
Medical Counselling	--	20.4	22.2	32.0	26.9	37.0	30.3	28.8
Diet Counselling	--	--	--	37.5	30.9	30.5	38.2	40.1
Psychotherapy	2.0	3.3	1.4	2.5	2.9	1.3	2.5	2.0
Intensity Index	--	0.91	0.89	0.91	1.01	0.92	1.00	0.95
Length of Visit	15.0	16.4	15.3	14.6	14.4	15.5	15.5	15.2

TABLE 6-20

SPECIALTY DIFFERENCES IN THE TREATMENT OF DIABETES

	1974	1975	1976	1977	1978	1979	1980	1981
Clinical Lab Tests								
FPs	76.2	63.8	80.3	63.1	74.4	73.6	71.1	75.5
GPs	55.8	72.3	72.0	67.2	59.4	71.8	63.4	71.1
Internists	69.6	81.3	70.4	72.9	79.4	72.3	69.6	63.7
ECG								
FPs	--	2.2	1.9	0.5	0.9	3.1	0.5	1.7
GPs	--	2.2	2.1	2.7	3.0	1.6	2.9	0.6
Internists	--	1.2	11.4	8.6	15.2	8.0	9.4	11.8
Drugs								
FPs	68.7	30.6	32.3	72.4	47.4	57.4	77.7	74.0
GPs	69.1	64.5	64.0	71.1	66.9	61.9	84.3	71.7
Internists	62.2	38.8	48.4	63.0	67.4	59.0	79.8	82.5
All Counselling								
FPs	--	40.8	25.6	66.0	74.3	52.9	60.4	58.2
GPs	--	19.7	17.9	45.0	46.7	55.4	50.1	49.9
Internists	--	25.7	29.5	62.1	48.4	58.7	59.7	59.7
Intensity Index								
FPs	--	0.52	0.62	0.73	0.65	0.82	0.78	0.68
GPs	--	0.75	0.77	0.77	0.75	0.83	0.82	0.77
Internists	--	1.13	1.11	1.15	1.34	0.96	1.15	1.15
Length of Visit								
FPs	14.0	9.0	10.4	10.2	12.1	12.2	12.6	13.7
GPs	13.1	14.9	13.2	14.6	12.2	14.2	14.0	12.6
Internists	18.5	19.0	19.6	17.6	16.1	18.3	18.0	17.3

diet counselling. Although GPs counsel their diabetic patient less frequently than do internists and FPs, all specialties have increased their use of this service (Table 6-20).

6.3.7 Stomach/Abdominal Pain Visits

Office visits for stomach or abdominal pain are distributed much more broadly across physician specialties than are office visits for the other tracers (see Table 6-21). Although office visits to GPs have declined from 46.6 percent of all office visits for stomach/abdominal pains in 1974 to 27.4 percent in 1981, they still remain the specialty most frequently seen. They are followed by, in order of frequency, internists, FPs, general surgeons, OB-GYNs, and pediatricians. Although all of these specialties have increased their visit share to offset declining GP visits, rates of increase are highest for FPs and internists.

Both the time spent and the service intensity of stomach pain visits have increased over time (see Table 6-22). Although Table 6-23 indicates that office visits to internists are the longest and the most service intensive, their rates of increase are quite modest, compared with other physician specialties. The average intensity of these visits is quite high in absolute terms, compared with other tracers. This reflects the wide range of services used in diagnosing and treating these symptoms, including endoscopy. Although endoscopies are performed in only 2-3 percent of stomach pain visits, this is still well above the national average of one percent. Also recall from Table 6-3 that endoscopies are the highest-priced ancillary in the index, with a relative value twice that of an ECG or x-ray.

Physicians employ a variety of techniques in diagnosing stomach/abdominal pains (see Table 6-22). Limited physical exams and histories have increased the most in frequency and are now given in two-thirds of visits for stomach/abdominal pain. Blood pressure is checked in over forty percent of visits, followed, in order of frequency, by lab tests, a general exam and history, and x-rays. There appears to be a slight trend toward more lab tests generally, and more x-rays on the part of GPs and internists.

Medical and diet counselling is the therapeutic service which has increased the most dramatically in frequency, especially among GPs. Drugs remain the most common therapeutic treatment, however, being prescribed in close to 70 percent of office visits for stomach/abdominal pains. As might be expected, the frequencies of counselling and drugs are lower for general surgeons and OB-GYNs than they are for internists and general and family practitioners.

TABLE 6-21

CHANGES IN THE SPECIALTY MIX TREATING STOMACH/ABDOMINAL PAIN OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	3.7	6.2	6.8	17.1	9.2	11.0	13.8	17.6
GPs	46.6	42.9	43.9	34.3	35.4	34.0	31.2	27.4
General Surgeons	9.7	13.0	10.0	12.3	14.6	10.6	7.9	10.3
Internists	15.1	15.1	14.2	18.7	20.2	19.5	18.5	19.3
OB-GYNs	6.4	8.6	8.2	6.5	8.2	9.0	11.1	8.5
Pediatricians	5.1	5.1	7.9	5.1	5.7	6.0	6.7	7.9
Allergists	0.0	0.1	0.0	0.1	0.2	0.1	0.0	0.1
Cardiologists	0.8	0.7	1.5	0.8	0.9	2.0	0.8	1.2
Dermatologists	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Other medical specialists[a]	3.2	2.1	3.1	1.2	3.5	5.1	3.2	4.7
Ophthalmologists	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthopedic Surgeons	0.6	0.1	0.2	0.1	0.0	0.0	0.4	0.2
Otolaryngologists	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0
Urologists	3.3	2.6	3.0	2.1	0.8	1.0	1.6	1.4
Other surgical specialists	1.3	0.6	0.5	0.5	0.6	0.2	1.4	0.4
Psychiatrists	0.4	0.7	0.1	0.3	0.2	0.1	0.2	0.6
Other	3.0	2.1	0.5	0.7	0.6	1.3	3.2	0.6

[a]Includes neurologists

TABLE 6-22

CHANGES IN THE TREATMENT OF STOMACH/ABDOMINAL PAINS OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	55.4	57.2	61.1	64.2	67.9	63.2	66.2
General History/Exam	--	23.9	24.7	28.9	27.7	23.2	24.0	22.6
Clinical Lab Test	27.7	32.4	32.4	27.9	29.3	33.9	32.1	38.1
X-ray	15.1	16.0	14.7	14.8	15.6	15.3	15.7	16.9
Blood Pressure Check	--	42.4	37.4	40.9	40.8	50.6	42.8	43.0
Pap Test	--	--	--	7.0	5.6	4.4	4.8	3.9
ECG	--	3.1	3.0	4.6	2.3	3.4	1.9	3.7
Vision Test	--	0.3	0.5	0.4	0.1	0.3	0.2	0.4
Endoscopy	--	1.9	1.6	2.2	2.3	2.9	2.4	2.1
Therapeutic Services								
Drugs	66.9	56.8	58.3	71.5	65.8	69.3	70.1	67.1
Office Surgery	--	1.7	1.5	1.3	1.5	1.5	2.1	1.1
Physiotherapy	--	0.6	0.9	1.6	1.3	0.8	2.2	0.9
All Counselling	--	18.9	17.2	40.3	38.5	37.0	50.6	49.4
Medical Counselling	--	16.0	15.4	28.6	24.7	27.1	32.6	33.6
Diet Counselling	--	--	--	16.6	19.7	14.7	24.0	21.4
Psychotherapy	3.9	3.8	2.4	4.4	3.7	2.3	3.6	3.3
Intensity Index	--	0.95	0.91	1.06	1.00	1.04	1.05	1.08
Length of Visit	15.5	15.9	15.9	16.1	16.2	16.8	16.5	17.4

TABLE 6-23

SPECIALTY DIFFERENCES IN THE TREATMENT OF STOMACH/ABDOMINAL PAINS

	1974	1975	1976	1977	1978	1979	1980	1981
Clinical Lab Tests								
FPs	28.0	31.5	29.4	30.5	31.6	39.1	33.0	45.5
GPs	23.2	29.7	29.6	17.4	27.8	34.8	30.2	34.5
General Surgeons	19.8	23.7	23.8	15.0	17.4	17.1	10.0	21.2
Internists	32.9	38.5	34.3	38.3	34.0	37.0	35.5	36.4
OB-GYNs	37.9	44.6	43.9	42.6	34.2	32.4	35.8	48.3
X-Ray								
FPs	27.0	12.4	12.3	8.0	9.5	11.1	20.5	14.5
GPs	12.4	15.4	10.6	11.7	11.4	12.9	18.6	21.0
General Surgeons	17.5	16.9	19.9	23.3	23.5	26.8	21.8	14.3
Internists	20.3	22.7	26.4	24.0	24.9	23.2	19.6	26.1
OB-GYNs	4.8	7.1	9.4	3.3	0.7	2.4	3.8	2.1
Endoscopy								
FPs	--	0.4	1.7	3.1	0.5	1.4	3.2	0.0
GPs	--	0.5	0.9	1.1	0.0	4.6	0.4	0.0
General Surgeons	--	2.0	1.8	4.2	3.6	3.9	2.5	0.8
Internists	--	1.7	0.4	2.1	2.8	0.8	1.9	4.3
OB-GYNs	--	1.9	2.1	3.6	0.0	0.0	0.3	1.5
Drugs								
FPs	71.3	65.4	70.8	81.4	75.7	76.1	74.0	76.8
GPs	77.2	68.1	66.3	78.7	74.9	78.2	82.4	78.4
General Surgeons	49.3	35.1	38.7	53.9	50.5	53.4	35.6	41.9
Internists	65.6	58.8	55.9	72.0	66.4	68.7	74.2	75.9
OB-GYNs	56.5	39.6	43.1	64.6	52.5	60.3	55.1	47.2
All Counselling								
FPs	--	18.9	17.1	46.9	54.6	41.6	47.2	49.3
GPs	--	17.3	14.0	34.2	33.3	38.2	58.9	43.5
General Surgeons	--	18.1	13.0	34.3	31.1	32.0	24.2	34.0
Internists	--	18.9	28.9	55.7	50.0	39.9	50.3	61.4
OB-GYNs	--	15.6	16.0	43.2	31.6	25.8	53.4	37.5
Intensity Index								
FPs	--	0.74	0.80	0.92	0.74	0.92	1.18	0.87
GPs	--	0.86	0.76	0.85	0.76	1.07	0.99	1.11
General Surgeons	--	0.82	0.87	0.87	1.09	1.10	1.20	0.98
Internists	--	1.28	1.32	1.52	1.34	1.18	1.17	1.49
OB-GYNs	--	0.72	0.79	1.04	0.81	0.67	0.74	0.91
Length of Visit								
FPs	10.2	13.7	12.4	11.7	14.2	13.6	13.9	13.9
GPs	13.5	14.4	13.9	15.1	13.6	14.7	15.3	16.2
General Surgeons	15.9	15.9	16.3	16.0	15.8	15.8	18.0	16.1
Internists	20.6	19.0	20.5	20.5	19.9	20.8	20.3	21.8
OB-GYNs	14.9	14.3	15.2	17.9	16.0	15.6	15.3	17.4

6.3.8 Back Problem Visits

Although office visits to GPs have been shrinking rapidly as a proportion of all office visits for back problems, patients with back problems are still more likely to see a GP than any other type of physician (see Table 6-24). Office visits to orthopedic surgeons are the second most common, making up more than one out of five office visits for back problems, followed by visits to internists. Office visit shares have not increased markedly for these two specialties; instead FPs have taken up most of the slack resulting from declining GP shares.

Both the length and the service intensity of office visits for back problems have clearly increased over time, but considerable fluctuation is evident (see Table 6-25). Longer visits appear to be chiefly the result of the changing specialty mix; only general surgeons (who account for only 5-6% of visits) are spending more time with patients. The substantial rise in the intensity index (almost 20 percent), however, appears to reflect increasing service intensity among all specialties, this is probably due in large part to the greater reliance on x-rays and physiotherapy, trends which are particularly marked among orthopedic surgeons (See Table 6-26).

Physiotherapy is a common therapeutic service in the treatment of back problems, and its use has increased across most specialties. Drugs and counselling are also frequently provided, with the latter showing the same increase over time observed for other tracers. As we might expect, general and orthopedic surgeons are less apt to prescribe drugs compared with their medical colleagues.

6.3.9 Headache Visits

Patients with headaches as a chief complaint are less likely to visit GPs (see Table 6-27) by 1981 and more likely to see family practitioners, internists, pediatricians, and other medical specialists (presumably neurologists). Ophthalmologist visits have remained fairly constant at 5 percent of all headache visits. While the average office visit for headaches has gotten somewhat longer over time, average service intensity appears unchanged (see Table 6-28). This may largely reflect specialty shifts, as Table 6-29 shows similar trends for these two measures across specialties.

The only diagnostic service to have clearly increased over time for headache visits is a limited physical exam and history; in recent years, a limited exam was given and a limited history was taken in two out of three

TABLE 6-24

CHANGES IN THE SPECIALTY MIX TREATING BACK PROBLEMS OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	3.6	4.3	4.1	10.1	8.4	9.0	10.8	13.3
GPs	46.3	51.3	43.8	41.1	36.0	34.4	32.6	30.6
General Surgeons	6.3	5.0	5.0	5.0	6.0	5.1	3.7	5.9
Internists	11.8	10.3	10.1	11.7	12.4	11.2	11.8	14.1
OB-GYNs	1.6	1.8	1.5	1.7	1.2	1.0	2.7	1.1
Pediatricians	3.3	3.0	3.9	4.0	2.7	3.7	5.2	4.0
Allergists	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2
Cardiologists	0.4	0.5	0.5	0.6	0.6	0.7	0.4	1.2
Dermatologists	0.1	0.0	0.0	0.0	0.5	1.0	0.4	0.0
Other medical specialists[a]	0.7	2.1	0.9	0.9	1.3	1.2	1.6	2.1
Ophthalmologists	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.3
Orthopedic Surgeons	20.8	16.3	23.3	18.4	25.8	22.4	23.3	22.0
Otolaryngologists	0.1	0.0	0.0	0.0	0.5	1.0	0.4	0.0
Urologists	1.6	2.1	1.2	2.2	1.3	2.4	1.0	0.8
Other surgical specialists	2.3	1.7	2.2	3.5	3.1	5.5	3.5	3.2
Psychiatrists	0.5	0.5	2.2	0.3	0.3	1.1	1.8	0.7
Other	3.5	3.5	4.8	4.0	2.7	4.5	5.3	4.2

[a]Includes neurologists

TABLE 6-25

CHANGES IN THE TREATMENT OF BACK PROBLEMS OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	57.9	57.0	61.5	66.9	68.8	63.3	68.8
General History/Exam	--	11.4	14.7	19.4	20.4	17.6	17.9	15.3
Clinical Lab Test	11.9	14.7	12.9	15.4	12.9	15.3	11.6	12.8
X-ray	14.7	15.7	18.9	20.8	17.4	19.2	20.5	19.0
Blood Pressure Check	--	30.3	28.0	30.2	28.1	34.2	32.0	32.1
Pap Test	--	--	--	1.4	1.5	0.9	1.1	1.2
ECG	--	1.8	1.4	1.6	1.9	0.7	1.1	1.0
Vision Test	--	0.4	0.2	0.4	0.3	0.4	0.0	0.1
Endoscopy	--	0.1	0.3	0.6	0.6	0.8	0.1	0.1
Therapeutic Services								
Drugs	58.4	52.9	56.2	60.6	59.1	60.6	62.1	60.4
Office Surgery	--	1.3	1.6	3.4	2.7	2.4	1.6	1.2
Physiotherapy	--	23.0	27.7	28.7	27.6	24.4	38.1	31.7
All Counselling	--	14.4	17.0	23.6	24.8	28.5	27.0	28.6
Medical Counselling	--	11.8	15.0	19.4	20.2	26.4	22.9	25.8
Diet Counselling	--	--	--	1.7	2.4	2.6	3.5	3.1
Psychotherapy	2.2	3.7	2.8	4.3	4.0	1.8	2.3	1.9
Intensity Index	--	1.06	1.21	1.36	1.25	1.23	1.41	1.27
Length of Visit	15.6	15.5	16.5	16.2	15.2	16.3	17.1	16.2

TABLE 6-26

SPECIALTY DIFFERENCES IN THE TREATMENT OF BACK PROBLEMS

	1974	1975	1976	1977	1978	1979	1980	1981
X-Ray								
FPs	19.1	14.1	21.7	15.8	21.9	15.4	20.8	13.4
GPs	9.4	10.2	11.3	14.1	10.6	14.9	12.5	13.4
General Surgeons	12.6	19.4	15.5	22.4	7.8	21.1	21.6	11.5
Internists	17.6	13.3	16.1	16.4	23.4	17.5	26.9	16.9
Orthopedic Surgeons	25.2	33.1	35.2	44.8	28.1	31.9	34.1	38.6
Drugs								
FPs	84.8	73.3	74.1	79.0	76.5	86.6	82.7	77.7
GPs	64.6	59.4	68.7	68.3	67.8	68.7	68.0	72.3
General Surgeons	56.2	48.0	42.9	77.2	60.7	69.2	52.8	52.3
Internists	74.7	68.0	70.9	67.4	72.6	82.8	77.1	71.2
Orthopedic Surgeons	37.9	34.3	35.6	35.1	43.7	37.3	48.0	38.8
Physiotherapy								
FPs	--	30.4	5.8	10.1	26.9	12.7	23.0	29.0
GPs	--	31.4	37.8	38.1	40.0	37.5	54.7	34.2
General Surgeons	--	6.4	11.8	13.8	8.5	14.1	17.0	36.4
Internists	--	8.8	9.0	23.7	13.4	11.8	32.3	18.0
Orthopedic Surgeons	--	8.0	22.2	21.9	22.6	19.8	33.1	38.9
Intensity Index								
FPs	--	1.17	1.04	0.97	1.51	0.99	1.27	1.19
GPs	--	1.06	1.23	1.35	1.26	1.41	1.47	1.20
General Surgeons	--	0.84	0.86	1.16	0.82	1.11	1.20	1.24
Internists	--	0.97	1.16	1.53	1.49	1.54	1.72	1.20
Orthopedic Surgeons	--	1.09	1.31	1.56	1.18	1.16	1.48	1.62
Length of Visit								
FPs	12.6	10.2	10.3	11.3	11.6	12.6	14.6	14.0
GPs	14.3	14.3	13.6	14.1	14.0	14.4	15.0	14.0
General Surgeons	11.9	12.0	15.9	13.5	12.2	16.8	17.5	14.7
Internists	20.5	16.3	17.4	17.3	18.4	17.9	20.7	18.6
Orthopedic Surgeons	15.4	17.5	20.3	17.5	15.8	16.7	16.3	16.1

TABLE 6-27

CHANGES IN THE SPECIALTY MIX TREATING HEADACHE OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	2.3	7.6	6.7	12.9	8.9	9.5	14.6	15.7
GPs	52.7	49.2	47.8	40.0	42.9	37.9	30.9	26.6
General Surgeons	3.2	4.3	3.6	3.1	2.8	4.5	3.0	4.6
Internists	14.1	12.4	14.6	14.1	16.3	17.8	19.0	18.0
OB-GYNs	2.3	2.6	2.2	1.2	1.9	1.8	2.6	2.3
Pediatricians	2.8	3.1	4.0	4.8	4.9	5.1	6.2	7.0
Allergists	1.4	0.9	2.7	1.2	0.2	1.6	0.2	0.8
Cardiologists	0.7	1.2	1.3	1.5	0.6	1.0	1.3	2.3
Dermatologists	0.0	0.0	0.0	0.1	0.0	0.0	1.3	0.2
Other medical specialists[a]	4.0	3.6	2.6	4.8	6.7	4.3	6.1	7.3
Ophthalmologists	5.3	4.8	5.6	5.6	5.6	4.1	4.2	5.1
Orthopedic Surgeons	0.3	0.7	1.1	0.5	0.6	0.4	0.1	0.1
Otolaryngologists	5.7	3.9	3.2	4.4	4.1	3.1	1.9	3.1
Urologists	0.2	0.3	0.1	0.2	0.1	0.5	0.0	0.0
Other surgical specialists	2.7	1.4	1.3	3.7	2.8	4.0	1.8	2.7
Psychiatrists	1.4	1.2	1.4	1.2	1.1	2.6	2.5	1.0
Other	1.5	2.9	1.8	0.6	0.5	2.0	4.3	3.4

[a]Includes neurologists

TABLE 6-28

CHANGES IN THE TREATMENT OF HEADACHE OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	52.1	57.1	59.1	65.2	65.9	66.2	68.4
General History/Exam	--	20.8	18.5	25.5	21.7	18.2	20.6	19.6
Clinical Lab Test	18.0	16.6	21.0	15.8	16.1	20.7	13.1	17.7
X-ray	6.2	7.1	6.6	8.0	9.9	9.2	6.1	5.3
Blood Pressure Check	--	50.1	50.8	51.7	46.8	54.1	50.3	48.7
Pap Test	--	--	--	1.7	0.9	1.7	1.1	1.5
ECG	--	4.3	4.8	4.3	2.5	2.4	4.2	4.1
Vision Test	--	7.4	8.2	5.4	7.3	6.1	7.4	7.9
Endoscopy	--	0.6	0.2	0.3	0.7	1.3	0.0	0.0
Therapeutic Services								
Drugs	76.1	75.6	66.6	76.2	75.1	78.4	79.4	79.6
Office Surgery	--	0.8	1.7	1.4	1.2	1.5	0.0	0.9
Physiotherapy	--	2.0	3.8	3.8	4.5	4.4	6.6	3.3
All Counselling	--	15.3	19.5	30.1	27.8	28.7	36.1	37.0
Medical Counselling	--	12.9	16.6	21.6	19.6	22.9	26.2	28.2
Diet Counselling	--	--	--	6.2	6.5	5.6	5.6	7.8
Psychotherapy	5.9	3.4	4.1	5.4	4.7	4.4	7.2	4.3
Intensity Index	--	0.87	0.90	0.88	0.94	0.97	0.88	0.87
Length of Visit	15.6	16.4	15.8	17.6	15.6	17.2	16.6	16.9

TABLE 6-29

SPECIALTY DIFFERENCES IN THE TREATMENT OF HEADACHE

	1974	1975	1976	1977	1978	1979	1980	1981
X-Ray								
FPs	0.0	0.1	6.1	6.0	4.2	11.8	4.2	10.9
GPs	4.2	5.0	3.3	7.2	7.9	4.9	2.8	1.4
Internists	11.1	12.5	11.9	10.2	17.4	10.2	16.3	6.6
Vision Test								
FPs	--	2.3	4.5	1.7	7.9	0.0	3.9	4.9
GPs	--	3.7	1.1	0.4	1.8	1.9	2.6	0.2
Internists	--	1.0	3.5	3.3	2.2	3.2	4.6	4.7
Psychiatrists								
Drugs								
FPs	87.1	81.6	54.7	79.4	78.9	91.1	95.9	90.2
GPs	86.5	85.8	80.0	85.8	88.1	90.2	85.0	86.4
Internists	76.3	70.0	71.6	73.7	79.1	80.1	79.0	89.7
All Counselling								
FPs	--	17.2	12.1	28.9	43.8	26.1	31.3	40.1
GPs	--	12.5	13.6	32.8	22.4	24.8	25.0	28.4
Internists	--	13.7	34.8	38.6	39.3	37.6	42.3	60.5
Intensity Index								
FPs	--	0.53	0.96	0.63	0.75	0.90	0.66	0.93
GPs	--	0.78	0.71	0.84	0.86	0.92	0.72	0.64
Internists	--	0.97	1.19	1.01	1.22	0.98	1.28	1.01
Length of Visit								
FPs	11.5	10.6	13.4	9.2	12.4	13.8	10.8	12.3
GPs	12.7	14.0	12.9	15.7	11.4	14.2	12.7	12.8
Internists	20.1	17.9	21.3	22.1	18.1	17.4	20.2	18.9

office visits for headaches, up from one in two in 1975 (see Table 6-28). The relative frequencies of general exams, blood pressure checks, vision tests, and lab tests have remained stable over time. Since internists and FPs are more likely than GPs to provide all of these services, however, these trends may not be representative of future treatment patterns.

Drug use is clearly the therapy of choice, about four of every five visits. Although overall use has remained constant, internists appear to be prescribing more over time. Medical counselling is on the rise for all visits and most dramatically so for internists. By 1981, internists counselled almost two-thirds of their patients presenting with headaches.

6.3.10 Anxiety/Nervousness Visits

A dramatic shift has occurred in the types of physicians treating patients for anxiety/nervousness: psychiatrists have replaced GPs as the type of physician most frequently seen by patients with a chief complaint of anxiety/nervousness (see Table 6-30). In 1974, 42.7 percent of office visits for anxiety/nervousness were to general practitioners and 28.4 percent were to psychiatrists; by 1981, these relative shares were reversed; 44.1 percent of visits were to psychiatrists and 21.9 percent were to GPs. Office visits to family practitioners have increased, of course, but visits to internists have remained about the same.

As visits to psychiatrists have become more frequent, the average length of office visits for anxiety/nervousness has naturally grown (see Table 6-31), but not as much as we might expect, given the very long psychiatrist visits. Table 6-32 indicates that psychiatrists spend far longer with patients than do other physicians, three-quarters of an hour, a standard which has remained the same for eight years. Among other physicians, internists have substantially longer visits than do general and family practitioners, and they appear to be increasing the time spent with these patients.

Average service intensity has been increasing over time, and dramatically so for internists. Among diagnostic services, limited exams/histories and blood pressure checks are most common and are performed with the same frequency. Surprisingly, ECGs, whose use in the U.S. as a whole has been falling (recall Table 3-1), are actually being provided more frequently over time in cases of anxiety/nervousness. In fact, absolute levels of ECG use in 1981 for anxiety visits were higher than those for visits generally: 5.9 percent versus 3.2 percent. Most other diagnostic services have remained constant over time.

TABLE 6-30

CHANGES IN THE SPECIALTY MIX TREATING ANXIETY/NERVOUSNESS OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
FPs	4.4	3.9	4.2	6.3	6.0	7.5	6.9	13.1
GPs	42.7	37.0	39.4	40.2	29.6	27.4	23.2	21.9
General Surgeons	3.3	5.0	1.0	3.3	2.5	2.2	2.0	3.5
Internists	13.1	14.0	12.9	11.1	15.9	13.1	12.2	12.1
OB-GYNs	2.1	3.9	1.8	2.2	1.4	1.2	1.7	0.5
Pediatricians	0.6	0.5	0.6	0.2	0.0	1.6	0.7	0.3
Allergists	0.5	0.1	0.0	0.4	0.0	0.0	0.0	0.0
Cardiologists	0.4	1.1	0.4	0.4	0.9	0.7	1.6	1.9
Dermatologists	0.0	0.1	0.0	0.4	0.0	0.4	0.3	1.2
Other medical specialists[a]	1.4	0.4	1.7	1.5	1.3	1.5	1.2	1.1
Ophthalmologists	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.0
Orthopedic Surgeons	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0
Otolaryngologists	0.2	0.0	0.0	0.3	0.0	0.0	0.2	0.0
Urologists	0.1	0.3	0.0	0.3	0.0	0.4	0.0	0.0
Other surgical specialists	0.3	0.1	0.0	0.0	0.1	0.1	0.3	0.2
Psychiatrists	28.4	33.3	34.3	32.8	41.7	43.7	48.1	44.1
Other	2.5	0.4	3.5	0.6	0.8	0.3	1.1	0.0

[a]Includes neurologists

TABLE 6-31

CHANGES IN THE TREATMENT OF ANXIETY/NERVOUSNESS OVER TIME

	1974	1975	1976	1977	1978	1979	1980	1981
Diagnostic Services								
Limited History/Exam	--	35.7	35.8	40.8	43.9	39.0	38.3	37.4
General History/Exam	--	8.9	14.8	18.6	14.2	10.0	9.5	12.7
Clinical Lab Test	12.3	11.4	8.5	10.5	8.7	10.6	7.5	11.3
X-ray	2.9	2.7	4.1	2.9	3.8	4.0	1.3	3.8
Blood Pressure Check	--	34.6	36.1	43.4	32.2	39.6	32.4	36.6
Pap Test	--	--	--	2.2	3.3	1.4	1.5	1.2
ECG	--	2.2	2.5	3.3	4.0	4.3	2.1	5.9
Vision Test	--	0.1	0.4	0.4	0.2	0.8	0.4	0.0
Endoscopy	--	0.6	0.4	0.2	0.2	1.0	0.1	0.0
Therapeutic Services								
Drugs	69.2	60.1	57.4	62.5	52.5	55.5	61.3	59.8
Office Surgery	--	0.2	0.5	0.4	0.3	0.2	0.1	0.0
Physiotherapy	--	0.5	0.8	0.9	1.8	0.4	1.8	0.1
All Counselling	--	52.1	59.3	61.3	70.2	71.4	77.3	72.9
Medical Counselling	--	12.5	20.0	18.5	17.3	17.4	18.7	19.3
Diet Counselling	--	--	--	4.7	4.4	5.2	5.5	2.9
Psychotherapy	39.6	44.2	43.6	45.1	57.0	54.9	61.2	54.9
Intensity Index	--	0.45	0.47	0.50	0.50	0.54	0.41	0.52
Length of Visit	24.8	26.1	26.2	25.3	32.1	29.5	31.0	29.7

TABLE 6-32

SPECIALTY DIFFERENCES IN THE TREATMENT OF ANXIETY/NERVOUSNESS

	1974	1975	1976	1977	1978	1979	1980	1981
Clinical Lab Tests								
FPs	17.1	9.3	15.3	16.4	7.6	8.7	11.1	14.5
GPs	8.7	14.0	6.4	10.2	11.5	14.4	14.4	15.2
Internists	37.6	27.3	26.0	22.5	22.9	29.6	18.5	41.6
Psychiatrists	0.6	0.2	1.0	1.1	0.2	0.5	0.5	0.3
Drugs								
FPs	67.6	63.7	64.1	69.4	66.5	77.5	93.5	74.5
GPs	86.5	80.3	79.2	84.8	78.3	88.8	87.6	91.6
Internists	75.0	77.1	75.8	75.6	66.4	65.4	82.9	86.6
Psychiatrists	39.3	28.3	25.7	25.8	25.6	24.9	34.8	35.0
All Counselling								
FPs	--	50.4	53.8	39.1	58.2	58.9	50.5	53.4
GPs	--	30.9	33.5	42.6	42.9	44.5	64.0	43.4
Internists	--	36.9	52.2	61.1	59.8	56.5	53.4	70.8
Psychiatrists	--	91.5	96.5	98.1	99.3	97.4	97.0	99.0
Psychotherapy								
FPs	27.2	38.3	21.1	16.9	43.2	37.9	27.0	33.7
GPs	17.2	20.8	15.3	17.7	24.6	20.6	30.8	11.2
Internists	20.1	21.9	20.8	28.9	23.9	18.1	38.2	35.9
Psychiatrists	91.1	91.1	95.6	98.0	99.3	96.9	95.9	97.8
Intensity Index								
FPs	--	0.32	0.43	0.65	0.31	0.39	0.45	0.54
GPs	--	0.58	0.52	0.61	0.55	0.75	0.59	0.65
Internists	--	0.84	1.09	0.91	1.33	1.40	0.81	1.71
Psychiatrists	--	0.14	0.15	0.13	0.11	0.12	0.15	0.15
Length of Visit								
FPs	13.4	11.5	12.1	15.9	13.0	18.0	12.0	15.5
GPs	13.2	14.5	14.6	13.3	14.0	15.7	16.7	14.6
Internists	22.5	19.4	22.2	20.0	24.1	19.5	25.0	27.5
Psychiatrists	45.3	46.7	43.3	45.8	52.7	45.6	45.0	44.7

The biggest change in treatment for anxiety/nervousness is the large increase in psychotherapy (see Table 6-31). This, of course, is the direct result of the increase in office visits to psychiatrists, virtually all of whom employ psychotherapy for treatment (see Table 6-32). Although psychotherapy rates are lower for other specialties, the latter, expecially internists, do provide a lot of medical counselling. However, except for psychiatrists, drugs remain the treatment of choice for anxiety/nervousness (see Table 6-31), and their use has been increasing among these other specialties.

6.4 Multivariate Analysis of Tracer Visits

Based on the descriptive data in the preceding section, treatment patterns for our ten tracers do indeed seem to be changing. Patients appear more likely to visit a specialist for care in 1981 than they did in 1974. The nature of these visits also appears to be changing, although time trends are not consistent for all of the tracers. While some visits, such as those for chronic ischemic heart disease (CIHD), are clearly growing longer and involving more ancillary services, other visits, such as otitis media, actually appear to be growing less intensive over time. Our descriptive analysis has two limitations, however: (1) we do not know whether these changes are statistically significant, and (2) we do not know whether any observed time trends are due solely to the changing specialty mix. The regression analysis presented in this section addresses both of these issues. In addition, we examine the change in the probability of seeing a specialist over time.

6.4.1 Empirical Specification and Estimation

A reduced-form equation for treatment patterns can be specified as follows:

$$\text{LOV, INDEX} = f(\text{TIME; PTCHAR; SPEC; MDCHAR; PROD; LOC})$$

where
LOV = length of office visit,
INDEX = intensity index,
TIME = time,
PTCHAR = patient characteristics,
SPEC = physician specialty,
MDCHAR = physician characteristics
PROD = physician productivity, and
LOC = geographic location.

A similar specification is used to estimate the probability of seeing a specialist (PROBSPEC), except that the physician variables (SPEC, MDCHAR, and PROD) are omitted. Means for all variables are presented in Tables 6-33 and 6-35.*

Dependent Variables

Three equations were estimated for each of the tracers, or 30 regressions in all. The dependent variables were: (1) length of visit (LOV), specified in minutes, (2) the intensity index, standardized to an average value of one, and (3) the probability of visiting a specialist. The latter, PROBSPEC, was set equal to one if the visit was to a specialist, and zero if to a general or family practitioner.

The identical equation was estimated with both the LOV and INDEX specifications. Minor changes were made in equation specification for the different tracers, as described below. All physician-related variables were dropped from the PROBSPEC specification.

Independent Variables

Our time trend is the chief analytic variable of interest for this analysis. It is numbered consecutively one through eight beginning in 1974. A positive significant coefficient associated with the TIME variable will mean that the treatment of a given tracer condition is becoming more physician time- or service-intensive, or that the condition is more likely to be treated by a specialist.

Estimating our equations within tracer of course adjusts for much of the casemix differences expected to influence treatment patterns. Nevertheless, patient and visit characteristics <u>within</u> tracer may still explain visit intensity or the likelihood of visiting a specialist. In order to hold these constant, we included a number of patient demographic, visit status, and severity variables, similar to those used earlier in the development of our casemix index. Patient demographic variables include sex, age, and race. FEMPT is a dummy variable set equal to one if the patient was female and zero if male. For obvious reasons, it was dropped from the prenatal visit equations. The specification of patient age varies across the different tracers, and includes anywhere from one to three dummy variables. For the

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*Independent variable means for the PROBSPEC equation are the same as those shown in Table 6-33.

TABLE 6-33

MEANS FOR TRACER LENGTH OF VISIT AND SPECPROB REGRESSIONS, 1974-1981

	Prenatal	Well Baby	Otitis Media	Hyper-tension	CIHD
LOV	10.48	12.83	11.05	14.57	17.17
SPECPROB	0.78	0.82	0.74	0.44	0.58
TIME	4.51	4.44	4.72	4.48	3.93
FEMPT	--	0.49	0.49	0.62	0.46
PTAGE:					
< 1	--	0.62	--	--	--
< 14	--	--	0.76	--	--
< 20	0.13	--	--	--	--
≥ 35	0.05	--	--	--	--
65+	--	--	--	0.38	0.58
NONWHITE	0.12	0.10	0.06	0.13	0.07
NEWPT	0.09	0.08	0.13	0.05	0.04
NEWPROB	0.08	0.20	0.33	0.05	0.06
SECDX	0.04	0.09	0.25	0.35	0.51
SPEC:					
FP	0.07	0.06	0.09	0.12	0.10
IM	--	--	--	0.32	0.40
OB	0.76	--	--	--	--
PED	--	0.80	0.51	--	--
GS	--	--	--	0.04	--
CARD	--	--	--	0.03	0.13
ENT	--	--	0.18	--	--
OTHSPEC	0.02	0.02	0.06	0.06	0.06
BOARD	0.63	0.68	0.64	0.34	0.43
MDAGE	46.24	46.94	46.39	52.41	51.38
MDAGESQ	2225.46	2299.04	2259.62	2869.12	2745.63
FEMMD	0.04	0.08	0.07	0.03	0.01
SOLO	0.42	0.43	0.44	0.67	0.60
NE	0.20	0.30	0.21	0.28	0.28
SOUTH	0.31	0.27	0.35	0.27	0.31
WEST	0.19	0.16	0.20	0.18	0.16
RURAL	0.29	0.21	0.28	0.27	0.27

TABLE 6-33 cont.

MEANS FOR TRACER LENGTH OF VISIT AND SPECPROB REGRESSIONS, 1974-1981

	Diabetes	Stomach Pain	Back Problems	Head Ache	Anxiety
LOV	15.43	16.29	16.11	16.60	28.55
SPECPROB	0.47	0.54	0.59	0.51	0.60
TIME	4.36	4.11	4.35	4.17	4.12
FEMPT	0.58	0.66	0.51	0.69	0.66
PTAGE:					
<14	--	0.11	--	--	--
25-44	--	--	0.34	0.33	0.42
45-64	--	--	0.33	0.27	0.31
65+	0.42	0.15	0.15	0.15	0.12
NONWHITE	0.15	0.14	0.14	0.15	0.10
NEWPT	0.05	0.18	0.19	0.18	0.07
NEWPROB	0.06	0.37	0.24	0.26	0.12
SECDX	0.47	0.27	0.26	0.31	0.29
SPEC:					
FP	0.14	0.11	0.09	0.10	0.06
IM	0.33	0.18	0.14	0.17	0.14
OB	--	0.09	--	--	--
PED	--	0.06	0.01	0.05	--
GS	0.03	0.12	0.06	0.04	--
OPHTHAL	0.03	--	--	0.05	--
ORTHO	--	--	0.26	--	--
PSYCH	--	--	--	--	0.40
OTHSPEC	0.09	0.10	0.13	0.21	0.10
BOARD	0.37	0.44	0.50	0.41	0.40
MDAGE	51.62	49.78	50.18	51.24	51.70
MDAGESQ	2779.10	2588.51	2632.70	2740.61	2788.54
FEMMD	0.03	0.03	0.01	0.03	0.04
SOLO	0.65	0.58	0.54	0.64	0.77
NE	0.25	0.22	0.19	0.24	0.30
SOUTH	0.33	0.36	0.39	0.37	0.32
WEST	0.17	0.19	0.21	0.18	0.19
RURAL	0.31	0.29	0.25	0.29	0.18

prenatal tracer, for example, two age variables were included to capture high-risk pregnancies: prospective teen-age mothers (PTAGE < 20) and older mothers (PTAGE $\geq$ 35). Woman aged 20-34 were included in the intercept. NONWHITE is a dummy variable set equal to one if the patient belonged to any race other than white, and zero otherwise.

Visit status includes two dummy variables: NEWPT equal to one if this was a new patient visit and NEWPROB equal to one if the visit was made by an old patient but for a new medical problem. New patients and patients with new problems are hypothesized to receive longer, more intensive visits, as physicians seek to evaluate their condition. The presence of a second medical problem is commonly used as a proxy for illness severity and should raise both visit length and the intensity index. SECDX is set equal to one if the patient has a second diagnosis, and zero otherwise.

A series of dummy specialty variables were included to capture variations in treatment as a function of physician training. The specialty dummies included in each tracer regression represented the specialties most commonly treating that tracer condition. In addition, an all-other-specialists variable was included for each tracer, so that the reference group was always, and solely, general practitioners. OTHSPEC was set equal to one if the visit were to any specialists not already singled out in that equation.

Physician characteristics were specified in the same manner as in the previous chapter: BOARD = 1 if the physician was board-certified, physician age specified in both linear and squared form (MDAGE and MDAGESQ), and FEMMD = 1 if the physician was female. Physician productivity was proxied by whether the physician was in solo or group practice, as group physicians may be better able to use aides in their production of office visits. SOLO is set equal to one if the physician is in solo practice, and zero otherwise.

Finally, we include four variables for the location of the physician's practice: whether in the Northeast (NE), South, or West regions (with the North Central region as the omitted category), and non-SMSA location (RURAL). These variables will help adjust for differences in demand and supply characteristics that may affect treatment patterns.

Estimation Methods

The LOV and INDEX equations were estimated using ordinary least squares (OLS) regressions. The LOV equations were estimated for the full eight-year time period (1974-1981), but the INDEX equations were based on 1975-1981 only. (Many of the ancillary services included in the intensity index were not part of the 1974 NAMCS questionnaire.)

Since our third dependent variable (PROBSPEC) is dichotomous, OLS regression techniques are inappropriate and probit analysis was used instead. The PROBSPEC equations were estimated for the full time-series.

Independent variables were stepped into each LOV and INDEX regression, beginning first with TIME, and then followed by all the remaining variables in the second (and final) step. This first regresssion enables us to determine the total impact of time on visit content, before adjusting for any other changes. From the second regression we obtain the net time trend, holding patient and physician characteristics constant.

6.4.2 Regression Results for Changes in Treatment Patterns

Length of Visit

Ten LOV regression equations are shown in Table 6-34. By reading across the columns, we can compare the impact of a given explanatory variable for all of the tracers. The first row of Table 6-34 presents the parameter estimate for TIME when it is the only variable included in the equation. The next row presents the TIME coefficient after all other variables are included in the equation; this TIME trend (row 2) can be interpreted as the marginal impact of time on visit content (minutes per year), after all other factors have been accounted for, including shifts in casemix, specialty mix, and productivity. R^2s at the bottom of the table refer only to the equation with all the variables included.

Although virtually all of the independent variables are statistically significant, R-squares are generally low: 0.20 or less.* In large part, this is because much of the variation in treatment patterns has been removed by estimating regressions separately for the different tracers. In addition, unexplained variation in visit lengths may be due to idiosyncratic physician behavior. Physicians may vary in how they treat patients simply as a function of how busy they are, or how much competition they're under. (Our location variables are only crude proxies for such circumstances.)

The gross, or total time trend, is significant and positive for every tracer, except diabetes. Rates of increase in average visit length range from only 0.07 minutes, or 4 seconds, per year for well baby visits to almost a

*The anxiety tracer is a notable exception, where a great deal of the variation is explained by whether the visit was made to a psychiatrist.

TABLE 6-34

LENGTH OF VISIT REGRESSIONS FOR TRACERS, 1974-1981

	Prenatal	Well Baby	Otitis Media	Hyper-tension	CIHD
TIME	0.21***	0.07**	0.09***	0.21***	0.32***
TIME	0.22***	0.05*	0.08**	0.02	0.07
FEMPT	--	-0.54***	-0.24*	-0.33**	-0.32
PTAGE:					
<1	--	-0.80***	--	--	--
<14	--	--	-0.89***	--	--
<20	-0.01	--	--	--	--
≥35	0.75	--	--	--	--
65+	--	--	--	-0.38**	-0.94***
NONWHITE	0.10	-0.84***	-0.76**	-0.98***	-0.86**
NEWPT	9.24***	1.32***	2.29***	10.25***	14.74***
NEWPROB	4.74***	-0.14	0.52***	4.60***	3.40***
SECDX	1.07***	0.68***	1.53***	2.54***	1.87***
SPEC:					
FP	1.14***	1.54***	1.80***	-2.17***	-1.53***
IM	--	--	--	4.36***	4.13***
OB	0.38*	--	--	--	--
PED	--	2.64***	2.44***	--	--
GS	--	--	--	-0.65	--
CARD	--	--	--	5.31***	5.80***
ENT	--	--	4.42***	--	--
OTHSPEC	1.60***	3.49***	2.88***	1.77***	2.13***
BOARD	-1.22***	-0.80***	-1.04***	2.54***	2.02***
MDAGE	-0.25***	-0.22***	-0.21***	-0.14**	-0.62***
MDAGESQ	0.003***	0.002***	0.003***	0.002***	0.007***
FEMMD	-0.09	0.61**	1.65***	2.87***	2.00**
SOLO	0.53***	0.33**	0.80***	-0.01	0.94***
NE	0.93***	1.39***	0.68***	1.33***	1.62***
SOUTH	0.13	0.70***	0.97***	1.26***	1.89***
WEST	1.88***	2.34***	1.31***	1.37***	1.79***
RURAL	-0.90***	-1.15***	-0.82***	-1.53***	-1.58***
CONSTANT	13.22***	15.43***	11.12***	11.26***	23.23***
R^2(c)	0.17	0.06	0.11	0.16	0.20
F(df)	(19,13825) =151.46***	(19,8338) =30.3***	(20,6979) =45.01***	(21,15765) =140.77***	(20,8795) =109.44***

TABLE 6-34 cont.

LENGTH OF VISIT REGRESSIONS FOR TRACERS, 1974-1981

	Diabetes	Stomach Pain	Back Problems	Head-Ache	Anxiety
TIME	-0.04	0.21***	0.17***	0.16**	0.90***
TIME	-0.23***	0.13***	0.001	0.02	0.01
FEMPT	-0.77***	0.57**	0.27	-0.02	-1.71***
PTAGE:					
<14	--	-0.85**	--	--	--
25-44	--	--	1.39***	0.74*	-0.26
45-64	--	--	1.87***	0.82**	-1.92***
65+	-0.51*	1.30***	0.98**	1.09**	-1.51**
NONWHITE	-1.27***	-0.85***	-1.34***	-1.19***	-3.26***
NEWPT	13.09***	6.13***	7.56***	8.01***	5.76***
NEWPROB	6.09***	0.81***	1.25***	1.38***	1.36**
SECDX	1.57***	1.92***	2.10***	1.87***	1.11**
SPEC:					
FP	-2.60***	-1.27***	-0.18	-2.03***	-1.97**
IM	3.50***	5.14***	4.83***	5.02***	7.32***
OB	--	0.09	--	--	--
PED	--	0.10	0.12	0.02	--
GS	-1.31	0.76*	0.51	0.45	--
OPHTHAL	5.47***	--	--	4.03***	**
ORTHO	--	--	2.92***	--	--
PSYCH	--	--	--	--	29.61***
OTHSPEC	1.42***	5.69***	7.04***	7.03***	2.63***
BOARD	2.04***	0.57**	0.81***	1.48***	2.35***
MDAGE	-0.53***	-0.37***	-0.18**	-0.31***	-0.14
MDAGESQ	0.006***	0.004***	0.003***	0.03***	0.002
FEMMD	2.19**	1.94***	1.76**	3.27***	6.22***
SOLO	-0.27	-0.13	0.92***	0.002	1.64***
NE	1.77***	1.31***	0.52	2.00***	0.37
SOUTH	2.34***	0.89***	0.0001	0.09	3.98***
WEST	1.77***	2.13***	1.59***	1.86***	1.83***
RURAL	-1.29***	-1.35***	-1.30***	-1.86***	-2.72***
CONSTANT	22.77***	17.87***	10.14***	16.91***	15.40***
R^2(c)	0.16	0.15	0.17	0.20	0.53
F(df)	(21,6021) =55.45***	(23,8684) =67.44***	(24,9389) =82.01***	(24,6296) =65.55***	(21,6443) =336.13***

***Significant at one percent level.
**Significant at five percent level.
*Significant at ten percent level.

full minute per year in the case of anxiety/nervousness. Tracers with the relatively larger time trends tend to be those in which the greatest shifts have occurred in specialty mix. Cardiologists have been rapidly replacing GPs in the treatment of CIHD, for example, and we observe that CIHD visits are two and a half minutes longer in 1981 than in 1974 (0.32*8 = 2.56).

Once we hold changing specialty mix and other patient and physician characteristics constant, visits are becoming significantly longer for only four of the ten tracers: prenatal, well baby, otitis media, and stomach pain. Rates of increase are generally small, although physicians are increasing their time spent with prenatal patients 0.22 minutes, or 13 seconds, per year. Surprisingly, physicians are actually <u>shortening</u> their diabetes visits, once we adjust for specialty substitution and other factors. The average visit by a diabetes patient has fallen almost two minutes over the 1974-1981 time period (0.23*8 = 110.4 seconds, or 1.84 minutes in all). The time trend is not significant for the remaining five tracers. Although it is difficult to generalize from only ten tracers, it appears as if physicians are spending more time with preventive types of visits (prenatal, well baby), while visit lengths remain stable (or even fall) for chronic disease visits (hypertension, CIHD, diabetes).

Female patients generally have shorter visits, but visits for stomach pain are significantly longer, presumably because potential gynecological disorders add to the physician's diagnostic work-up. Patient age variables are generally in the expected direction. It is interesting to note that visits by the elderly with chronic illnesses (hypertension, CIHD, diabetes) are significantly shorter while elderly visits for undiagnosed complaints (stomach pain, back problems, headache) are significantly longer.

Most puzzling are the shorter visits received by non-white patients for every tracer except prenatal care. The differences, furthermore, are substantial, ranging from 45 seconds less on average for non-white patients with otitis media to over three minutes less for those complaining of anxiety or nervousness. Since other patient and visit characteristics are held constant, it is difficult to ascribe a non-racial motivation for these shorter visits. One possibility is an interaction between race and specialty. If nonwhites are less likely to see specialists, then lengths of visit will be shorter for this reason alone. We explore this directly later.

As expected, new patient and new problem visits are uniformly longer than routine follow-up visits. Similarly, the presence of a second diagnosis complicates the treatment and thus significantly raises visit lengths for all tracers.

As a rule, specialists spend much more time treating the same diagnosis than do GPs, even holding constant patient and visit characteristics. The GS coefficient, however, is generally insignificant, suggesting that those general surgeons treating non-surgical cases (e.g., hypertention, diabetes, etc.) are not any different from GPs, at least not in this respect. The treatment patterns for FPs vary considerably by diagnosis, on the other hand. While spending much more time than GPs with their prenatal, well baby, and otitis media patients, FPs have significantly shorter visits for all of the other tracers. These differences help explain why the FP coefficient was insignificant in the LOV equation for the sample as a whole (recall Table 5-2).

Similarly, inconsistent treatment patterns across tracers for board-certified physicians may explain why being board-certified had no effect on visit lengths for the total sample. Board-certified physicians spend significantly more time than do their non-board-certified colleagues with seven of the tracer visits, but significantly less time with the other three.

As expected, the relationship between physician age and LOV is U-shaped with physicians spending less time with patients as their practice develops, but then increasing their visit lengths when they reach their 40's. (For some tracers, the U bottoms out much earlier or much later, however.)

Except (interestingly enough) for prenatal visits, women physicians spend far more time with their patients. This analysis confirms that diagnosis, or a differential mix of new and old patient visits, cannot explain the sexual difference in visit length. Women physicians spent 2.22 minutes more per visit on average (based on Table 5-2), and we see here that this ranges from only 0.61 minutes longer on well baby visits to over 6 minutes on visits for anxiety/nervousness.

It had been hypothesized that solo physicians would have longer visits than those in group practice, as the latter may be able to improve their productivity by substituting aide time for own time. This in fact appears to be the case, but only for seven of the ten tracers. The tracer visits showing no productivity gains to group practice (hypertension, diabetes, and headache) are those with the largest proportion of GP visits. GPs are more likely to be in solo practice compared with specialists, and the correlation may bias the SOLO coefficient downwards.

Finally, physicians do treat similar patients differently in different parts of the country. Western physicians consistently spend more time with patients compared with those in the North Central region. Visits also tend to be longer in the Northeast (for nine of the tracers) and in the South (seven

tracers). As expected, rural physicians have shorter visit lengths for all of the tracer conditions.

<u>Intensity Index</u>

Ten intensity index regressions are shown in Table 6-36. As before, we present the total impact of time (row 1) as well as the net time trend (row 2). Although the regressions leave much of the variation unexplained, the estimated coefficients are generally significant and in the expected directions. Again, by estimating our equations by tracer, we have removed much of the natural (inter-diagnosis) variation in treatment intensity. Although the coefficients associated with the time trend may appear quite small in absolute magnitude, they are much larger in relative terms for the intensity index itself generally averages less than one. There is considerable range, however, as seen by the means in Table 6-35. Prenatal, well baby, otitis media, and anxiety all average 0.50 or less on the intensity index, while stomach pain, back problems, and CIHD visits are of above average intensity. The remaining three tracers range from 0.8 to 0.9.

Treatment patterns are definitely changing over time, but not always in the same direction and not for all of the tracers. Based on the total time trends (row 1), physicians are providing more intensive visits for six of the ten tracers, but less intensive otitis media visits. Once we adjust for changing specialty mix and other physician/patient characteristics, however, some of the trends disappear or diminish in size. Even holding specialty constant, visits for prenatal care, well baby care, CIHD, and back problems are growing more service-intensive. The rates of increase are definitely smaller, however. CIHD visits, for example, are increasing in intensity at a gross rate of almost 4 percent per year (0.05/1.28), but only 2.3 percent annually (0.03/1.28) after adjusting for specialty shifts and other factors. Visits for anxiety, on the other hand, which showed no changes overall, are increasing slightly in intensity, once the shift toward psychiatrists (who order virtually no ancillaries) is held constant.

How are physicians changing their treatment of these conditions? We can determine the probable source of these changes by recalling the descriptive tables presented earlier. Physicians are more likely to prescribe some form of drug (presumably prenatal vitamin supplements) for their prenatal patients, for example, while performing more office surgery during well baby visits. CIHD visits include more ECGs, more drugs, and possibly more x-rays as well, while those for back problems are more likely to include more x-rays and

TABLE 6-35

MEANS FOR INTENSITY INDEX REGRESSIONS, 1975-1981

	Prenatal	Well Baby	Otitis Media	Hyper-tension	CIHD
INDEX	0.44	0.48	0.50	0.81	1.28
TIME	5.06	5.03	5.16	5.01	4.53
FEMPT	--	0.49	0.50	0.62	0.45
PTAGE:					
<1	--	0.62	--	--	--
<14	--	--	0.77	--	--
<20	0.13	--	--	--	--
≥ 35	0.04	--	--	--	--
65+	--	--	--	0.38	0.58
NONWHITE	0.12	0.11	0.06	0.13	0.07
NEWPT	0.09	0.08	0.13	0.05	0.05
NEWPROB	0.08	0.19	0.33	0.05	0.06
SECDX	0.05	0.09	0.26	0.37	0.53
SPEC:					
FP	0.07	0.07	0.09	0.13	0.11
IM	--	--	--	0.33	0.40
OB	0.77	--	--	--	--
PED	--	0.81	0.51	--	--
GS	--	--	--	0.04	--
CARD	--	--	--	0.03	0.15
ENT	--	--	0.18	--	--
OTHSPEC	0.02	0.01	0.06	0.06	0.06
BOARD	0.65	0.69	0.65	0.36	0.46
MDAGE	46.39	47.00	46.37	52.40	51.45
MDAGESQ	2239.97	2305.10	2258.16	2870.13	2754.34
FEMMD	0.04	0.09	0.07	0.03	0.01
SOLO	0.42	0.44	0.44	0.67	0.60
NE	0.20	0.31	0.22	0.28	0.29
SOUTH	0.32	0.27	0.36	0.27	0.30
WEST	0.19	0.15	0.20	0.18	0.17
RURAL	0.30	0.21	0.20	0.27	0.26

TABLE 6-35 cont.

MEANS FOR INTENSITY INDEX REGRESSIONS, 1975-1981

	Diabetes	Stomach Pain	Back Problems	Head Ache	Anxiety
INDEX	0.94	1.01	1.18	0.89	0.47
TIME	4.92	4.66	4.95	4.76	4.71
FEMPT	0.57	0.66	0.51	0.68	0.65
PTAGE:					
< 14	--	0.11	--	--	--
25-44	--	--	0.34	0.33	0.42
45-64	--	--	0.33	0.27	0.30
65+	0.42	0.16	0.15	0.15	0.13
NONWHITE	0.15	0.14	0.15	0.15	0.10
NEWPT	0.05	0.18	0.19	0.18	0.07
NEWPROB	0.06	0.38	0.25	0.26	0.12
SECDX	0.49	0.27	0.28	0.32	0.30
SPEC:					
FP	0.15	0.12	0.10	0.12	0.07
IM	0.34	0.19	0.14	0.17	0.14
OB	--	0.09	--	--	--
PED	--	0.07	0.01	0.05	--
GS	0.03	0.12	0.06	0.04	--
OPHTHAL	0.03	--	--	0.05	--
ORTHO	--	--	0.26	--	--
PSYCH	--	--	--	--	0.42
OTHSPEC	0.09	0.09	0.14	0.21	0.10
BOARD	0.39	0.46	0.52	0.43	0.42
MDAGE	51.56	49.86	50.30	51.14	51.76
MDAGESQ	2775.90	2598.04	2646.90	2731.60	2797.50
FEMMD	0.03	0.03	0.02	0.03	0.04
SOLO	0.65	0.58	0.54	0.64	0.77
NE	0.25	0.22	0.19	0.23	0.31
SOUTH	0.33	0.36	0.40	0.37	0.31
WEST	0.18	0.19	0.21	0.18	0.19
RURAL	0.31	0.29	0.25	0.29	0.17

TABLE 6-36

INTENSITY INDEX REGRESSIONS FOR TRACERS, 1975-1981

	Prenatal	Well Baby	Otitis Media	Hyper- tension	CIHD
TIME	0.01***	0.02***	-0.01*	0.02***	0.05***
TIME	0.01***	0.03***	-0.01*	0.003	0.03***
FEMPT	--	0.01	0.01	-0.11***	-0.00
PTAGE:					
< 1	--	-0.28***	--	--	--
< 14	--	--	-0.20***	--	--
< 20	0.05***	--	--	--	--
≥ 35	-0.0003	--	--	--	--
65+	--	--	--	-0.04*	-0.11***
NONWHITE	0.03*	-0.03	-0.01	-0.03	-0.01
NEWPT	0.40***	-0.10***	0.12***	1.03***	1.63***
NEWPROB	0.25***	-0.01	0.07***	0.53***	0.88***
SECDX	0.18***	0.17***	0.14***	0.32***	0.18***
SPEC:					
FP	-0.03	-0.13***	0.03	-0.11***	0.01
IM	--	--	--	0.37***	0.46***
OB	-0.002	--	--	--	--
PED	--	0.03	0.04	--	--
GS	--	--	--	-0.09	--
CARD	--	--	--	0.42***	0.75***
ENT	--	--	0.04	--	--
OTHSPEC	-0.01	0.19***	0.09**	0.12**	0.22***
BOARD	0.03***	0.07***	0.03	0.15***	0.18***
MDAGE	0.004	0.02***	-0.002	0.04***	0.03**
MDAGESQ	-0.00003	-0.0002***	0.0001	-0.0004***	-0.0002*
FEMMD	0.08***	0.01	-0.004	0.09	-0.03
SOLO	-0.01	0.01	0.02	-0.12***	-0.12***
NE	-0.07***	-0.10***	0.01	-0.07**	0.11**
SOUTH	-0.02*	-0.10***	0.03	0.03	0.27***
WEST	-0.08***	-0.10***	-0.04*	-0.08**	0.01
RURAL	0.03***	-0.02	-0.03**	-0.19***	-0.24***
CONSTANT	0.16	0.10	0.50***	-0.56***	-0.41
R^2(c)	0.08	0.07	0.05	0.09	0.12
F(df)	(19,11944) =56.73	(19,7028) =27.28***	(20,6180) =17.93***	(21,13630) =67.50***	(20,7238) =52.67***

TABLE 6-36 cont.

INTENSITY INDEX REGRESSIONS FOR TRACERS, 1975-1981

	Diabetes	Stomach Pain	Back Problems	Head Ache	Anxiety
TIME	0.01	0.02***	0.03***	-0.01	0.003
TIME	-0.01	0.01	0.02***	-0.02**	0.01*
FEMPT	-0.05	0.04	-0.12***	-0.05	-0.03
PTAGE:					
< 14	--	-0.26***	--	--	--
25-44	--	--	0.01	-0.01	0.08**
45-64	--	--	0.04	0.10**	0.16***
65+	-0.04	0.10**	0.06	0.09*	0.26***
NONWHITE	-0.03	-0.01	-0.13***	0.14***	0.03
NEWPT	0.54***	0.36***	0.60***	0.40***	0.40***
NEWPROB	0.24***	0.15***	0.39***	0.16***	0.07*
SECDX	0.26***	0.22***	0.13***	0.18***	0.15***
SPEC:					
FP	-0.11	-0.06	0.17***	0.05	-0.29***
IM	0.29***	0.32***	0.19***	0.32***	0.39***
OB	--	-0.23***	--	--	--
PED	--	-0.14*	-0.22	0.03	--
GS	0.07	0.01	-0.03	0.13	--
OPHTHAL	1.08***	--	--	1.01***	--
ORTHO	--	--	0.24***	--	--
PSYCH	--	--	--	--	-0.43**
OTHSPEC	0.17***	0.46***	-0.04	0.06	-0.02
BOARD	0.09*	0.07*	-0.13***	-0.004	0.08***
MDAGE	0.04***	0.02	0.01	0.02*	0.04***
MDAGESQ	-0.0004***	-0.0001	-0.0001	-0.0002*	-0.0004***
FEMMD	-0.01	0.04	0.20*	0.18*	-0.02
SOLO	-0.04	-0.13***	-0.20***	-0.17***	-0.22***
NE	-0.03	-0.03	-0.03	-0.07	-0.04
SOUTH	0.01	-0.09**	0.01	-0.0003	0.004
WEST	-0.07	-0.07	-0.04	0.04	-0.06
RURAL	-0.13***	-0.09**	-0.23***	-0.08**	-0.11***
CONSTANT	-0.33	0.27	0.66***	0.13	-0.48**
R^2(c)	0.08	0.05	0.06	0.08	0.16
F(df)	(21,5127) =21.41***	(23,7278) =19.20***	(24,7933) =22.98***	(24,5289) =21.04***	(23,5403) =47.29***

***Significant at one percent level.
**Significant at five percent level.
*Significant at ten percent level.

physiotherapy. The source of the small intensity increase in anxiety visits is less apparent, but may be due to a use of diagnostic services such as ECGs aimed as much to reassure a worried patient as to detect disease.

Visits for otitis media and headaches apparently are becoming less intensive over time, possibly because of less office surgery and fewer x-rays, respectively. No changes in intensity are evident for diabetes, hypertension, and stomach pain, although the gross time trends for the latter two were positive and significant. Those gross trends can probably be attributed to the changing specialty mix (held constant in our second regressions).

As for the remaining independent variables, patient age and sex vary in their impacts by tracer. Unlike our length of visit regressions, there are no systematic patterns in the treatment of nonwhite patients. Nonwhites receive less intensive visits in one of the tracers, but more intensive in two others. As expected, patients who are new to the physician, present with a new problem, or have a second diagnosis receive significantly more (or more expensive) services.

Specialists generally provide more intensive visits than GPs, although there are no differences for the two preventive tracers. Family practitioners show no consistently different trends in their treatment of patients; FP visits are less intensive in three tracers, more intensive in one, and no different from those of GPs for the remaining tracers.

Board-certified physicians almost always provide more intensive visits, although the treatment of back problems is a noteworthy exception. While there is a tendency for older physicians and women physicians to have more intensive visits in some instances, physician age and sex are generally insignificant. Solo physicians provide significantly less intensive visits for seven of the tracers, probably because they are less likely to have internalized ancillary production.

Unlike visit length, visit intensity does not vary much by region of the country. The one notable exception is that North Central physicians (in the intercept) provide significantly more intensive prenatal and well baby visits compared with physicians anywhere else. This contrasts with their very short visits noted earlier. As expected, rural physicians provide fewer (or less intensive) services to their patients than do their urban colleagues.

Probability of Seeing a Specialist

Finally, Table 6-37 presents the probit results analyzing the probability of seeing a specialist rather than a general or family practitioner. Because

TABLE 6-37

CHANGES IN PROBABILITY OF SEEING A SPECIALIST OVER TIME, 1974-1981[a]

	Prenatal	Well Baby	Otitis Media	Hyper-tension	CIHD
TIME	1.33***	0.10	0.82***	1.06***	1.83***
FEMPT	--	0.55	-0.65	-2.62***	-7.71***
PTAGE:					
< 1	--	-5.84***	--	--	--
< 14	--	--	22.89***	--	--
< 20	-10.40***	--	--	--	--
≥ 35	0.79	--	--	--	--
65+	--	--	--	-1.15	-9.91***
NONWHITE	-0.74	6.19***	7.50***	-0.82	-9.32***
NEWPT	5.68***	-0.79	-7.34***	7.97***	9.87***
NEWPROB	-11.28***	-3.18***	-18.13***	-1.62	-7.27***
SECDX	3.05*	2.10	-1.40	1.23	5.91***
NE	15.70***	11.26***	17.13***	4.66***	5.64***
SOUTH	11.93***	14.37***	6.28***	1.52	4.83***
WEST	-3.43***	-0.90	3.92***	0.24	-0.61
RURAL	-35.15***	-27.95***	-25.23***	-24.37***	-26.14***

TABLE 6-37 Cont.

CHANGES IN PROBABILITY OF SEEING A SPECIALIST OVER TIME, 1974-1981[a]

	Diabetes	Stomach Pain	Back Problems	Head-ache	Anxiety
TIME	0.99***	0.99***	1.31***	1.68***	1.87***
FEMPT	-2.59*	9.46***	-3.76***	-0.63	-5.21***
PTAGE:					
< 14	--	13.31***	--	--	--
25-44	--	--	3.30**	-8.18***	4.26
45-64	--	--	0.33	-7.90***	-10.19***
65+	0.73	1.83	-3.28*	-7.96***	-20.82***
NONWHITE	-1.19	-5.54***	-9.04***	-12.11***	-19.22***
NEWPT	17.59***	8.80***	13.47***	18.26***	-11.71***
NEWPROB	-5.64**	-9.03***	-15.92***	-6.03***	-22.64***
SECDX	2.93**	1.44	-0.13	1.41	-8.29***
NE	1.59	10.54***	10.15***	2.56	6.68***
SOUTH	-1.85	2.56*	6.62***	-2.46	9.24***
WEST	-3.88*	0.53	4.33***	1.50	-0.19
RURAL	-29.42***	-26.82***	-21.89***	-27.67***	-39.48***

[a]Table presents estimated marginal impacts that have been derived from the probit regressions, and are expressed as percentage point changes. The impact for TIME has been annualized.

***Significant at one percent level.
**Significant at five percent level.
*Significant at ten percent level.

the maximum likelihood estimates obtained from probit regression are not directly interpretable (unlike OLS estimates), we do not present them here. Instead, we present the marginal impacts of the independent variables on the probabilities. (Marginal impacts are derived from the maximum likelihood estimates, using the cumulative normal distribution table.) The impact for the TIME variable has been expressed as the annual percentage point change in the probability that a given visit is made to a specialist. Thus, the probability that a prenatal patient will see a specialist is increasing by 1.33 percentage points per year relative to a mean of 77.6 percent, holding patient characteristics and location constant. Because all of the remaining explanatory variables are discrete, dummy variables, the marginal impacts simply give the absolute change in the probability of visiting a specialist associated with positive values of the independent variables. Thus, being a pregnant teen-ager reduces the probability of seeing a specialist by 10.4 percentage points (around the mean of 78%).

Table 6-37 confirms the dramatic shifts in specialty mix over time observed earlier for these tracers. Except for well baby visits, which showed no change over time, the average patient was significantly more likely to visit a specialist. The magnitude of these changes is quite large, ranging from 0.8 percentage points per year for otitis media to 1.9 for CIHD and anxiety visits.

These findings suggest that the length of visit and intensity index regressions may underestimate long-term trends in treatment patterns. Consider diabetes, for example, whose treatment has not changed over time according to Tables 6-34 and 6-36. The probability of seeing a specialist has been increasing by about one percentage point per year, however, and we know that specialists (in this case, primarily internists) provide significantly longer, more intensive visits to their diabetes patients.

The effects of patient age and sex are somewhat difficult to interpret; the only apparent trends are that women patients and patients aged 65 and over are less likely to visit a specialist for a number of the tracers. Many elderly patients have undoubtedly developed long-standing relationships with GPs, which they wish to maintain, but why women should is unknown.

Earlier we saw that physicians spent significantly less time with their nonwhite patients in all of the tracers, except prenatal visits, and suggested that this may be due to reduced access to specialists. Table 6-37 suggests that this can only be a partial explanation; nonwhites are significantly less likely to visit specialists, but in only five of our tracers: CIHD and the four reason for visit tracers. Nonwhite patients are actually more likely to

see a specialist in the two pediatrician-dominated tracers: well baby and otitis media visits. Furthermore, there appears to be no differential access by race to specialist care for pregnancy, hypertension, or diabetes. This is particularly important as these conditions are disproportionately found among nonwhites; they accounted for 12.8 percent of all office visits made by black patients in 1975-76, for example, versus 9.4 percent of all patient visits (NCHS, 1979).

As expected, new patient visits are more likely to be made to specialists, while patients returning with a new problem usually visit a general or family practitioner. Prenatal, CIHD, and diabetes patients who have a second diagnosis, and whose care is presumably more complicated, are significantly more likely to visit a specialist. A second diagnosis does not raise the probability of seeing a specialist for the remaining tracers and actually lowers it for patients with anxiety or nervousness. In this latter case, a second diagnosis indicates that the patient has physical, as well as psychological, problems, and hence is more likely to see a general or family practitioner. (The specialists included in the anxiety tracer are largely psychiatrists.)

Patients are more likely to visit a specialist in the North East, and to a lesser extent in the South, compared with North Central region patients. As expected, the probability of seeing a specialist is consistently lower in rural areas, and the magnitudes of the urban/rural differences are very large (anywhere from 22-40 percentage points). The average prenatal patient living in a rural area would have only a 43 percent chance of being treated by an OB-GYN, compared with 78 percent for her urban counterpart (subtracting the marginal impact of 35.15 from the average probability of 77.6).

6.5 Summary of Tracer Results

Analysis of ten different tracer conditions has given us a comprehensive view of how the treatment of these conditions has changed from 1974 to 1981. At the same time, the sheer number of tracers may make it more difficult to identify common patterns of treatment across conditions. Table 6-38 summarizes these changes based on the regression analyses. Column 1 describes whether specialists (other than FPs, whose shares have grown uniformly) have significantly increased their share of office visits for the tracer and, if so, which specialties. The second column simply states the percent of visits actually provided by GPs and FPs. The next two columns present the gross (total) time trend in visit length (LOV) and visit intensity: whether visits

TABLE 6-38

SUMMARY OF CHANGES IN TREATMENT PATTERNS OVER TIME, 1974-1981

Tracer	Specialty Shift	GP/FP Concentration (1981)	Gross Change		Net Change	
			LOV	Intensity	LOV	Intensity
Prenatal	OB	20.1%	+	+	+	+
Well Baby	None	18.0	+	+	+	+
Otitis Media	PED	25.8	+	-	+	-
Hypertension	IM	52.6	+	+	n.s.	n.s.
CIHD	IM,CARD	32.4	+	+	n.s.	+
Diabetes	IM	50.8	n.s.	n.s.	-	n.s.
Stomach Pain	IM,OB,PED	45.0	+	+	+	n.s.
Back Problems	IM,ORTHO	43.9	+	+	n.s.	+
Headache	IM,PED,OTHMED	42.3	+	n.s.	n.s.	-
Anxiety	PSYCH	35.0	+	n.s.	n.s.	+

are growing significantly more (or less) time- and service-intensive or whether there has been no change (n.s., or not significant). The final two columns of Table 6-38 present the change in length of visit and intensity, net of specialty shifts and other exogenous changes.

The most dramatic changes in treatment have occurred in the two preventive tracers: prenatal and well baby care. These visits are becoming longer and more intensive over time, above and beyond those changes we would expect as a result of specialty shifts alone. In fact, well baby care is the only one of our tracers not to show a substitution of specialists for general and family practitioners, presumably because it is so dominated by specialists to start with. (Note the very low GP/FP concentration in column 2.)

Physicians are spending more time with patients in all of the remaining tracers (except diabetes), and sometimes providing more services as well. For many of these conditions, however, treatment has changed because the physicians themselves have changed. Once we account for the displacement of GPs by internists in the case of hypertension, for example, visits are neither longer nor more service-intensive. Even more surprising are the declining rates of ancillary use in several tracers. Physicians are actually ordering fewer, or a less expensive mix of services, in their otitis media and headache visits, *ceteris paribus*.

The chronic diseases (hypertension and diabetes) show the least net changes in visit content over time, possibly because the technology of treatment has changed very little over time. They are also the two tracers with the highest concentration of general and family practitioners. Nevertheless, hypertension and diabetes visits are increasingly being dominated by internists, and we may observe treatment changes in the long-run.

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APPENDIX A

STATISTICAL SIGNIFICANCE OF PARAMETER COMPARISONS

The question considered in this appendix is whether large inter-temporal differences in NAMCS variables are in fact statistically significant. Interpretation of the myriad of tables presented in this report is very much dependent on whether a five percent change in a parameter value from one year to another is sufficient to achieve statistical significance, or whether a fifty percent change is required. In a sense what we want is an approximate measure of precision of the NAMCS itself. This will be done here by calculating significance levels for inter-year differences for a number of variables taken from Table 3-1, and determining whether a given level of percentage change can be taken as equivalent to a conventional level of significance.

Calculating statistical significance of figures from the NAMCS is a complex task, due to the fact that the NAMCS sample is stratified rather than truly random. In other words each sample observation represents a different number of doctors or patient visits in the universe, so that when combining these observations to obtain national figures each has to be assigned a different weight. This means that ordinary statistical methods, if applied to either the weighted or unweighted NAMCS observations, would result in understated variances and exaggerated significance levels. A correction for this design effect* is therefore necessary to obtain exact significance levels. The practical importance of this design effect for the entire NAMC survey has not hitherto been determined.

We will consider three methods for calculating significance levels for inter-temporal differences between means. In order of increasing complexity and accuracy these methods are based on:

1) the formulas presented by Ezzati and McLemore (1980, Appendix 1);

2) the usual statistical methods applied to weighted NAMCS observations; and

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* An excellent summary of the design effect is given in Grannemann et al. (1981), Section 2C.

3) the formulas presented by Grannemann et al. (1981, Appendix B) which take the design effect into account.

The last is the theoretically correct method, but for ease in computation we would much prefer to use one of the other methods if nearly equivalent results could be obtained.

For our comparison of the above methods we will use data concerning changes in office visit content over time, as listed in Table 3-1. More specifically, this table concerns the percentage of visits which involve certain diagnostic and therapeutic services, as well as length of visit. The 1975 and 1979 values for twelve services and length of visit are reproduced in Table A-1. These variables were selected from the larger list in Table 3-1 using the criterion that neither 1975 nor 1979 seemed to deviate so greatly from the 1975-79 trend as to render statistical comparison of means meaningless. The variables in Table A-1 are ordered according to the absolute value of the percentage change occurring over the 1975-79 period, with medical counselling (from 12.3 to 22.2 percent of visits) at the top of the list with an 81 percent change and length of visit at the bottom with a three percent (14.5 to 14.9) change. To repeat our basic question, we wish to know which of these changes, which range from three to 81 percent, are statistically significant (i.e., the true population means for 1975 and 1979 are different).

We will consider the Ezzati-McLemore method first. Starting with their expression for root square error (p.44), noting that the standard error is equal to the variable mean times the root square error, and dividing by 100 to convert percentage points into fractions, the formula to compute the approximate variance for any parameter is Table A-1 becomes:

$$\frac{S^2_{ja}}{N_j} = \bar{X}_j \cdot \left(\frac{Z_j \cdot (1-\bar{X}_j)}{V_j} \right) \qquad \text{(A-1)}$$

TABLE A-1

CHANGES IN OFFICE VISIT CONTENT OVER TIME, 1975-79 STATISTICAL ANALYSIS

			Percent Change	t-statistic		
Service (% of Visits)	1975	1979	1975-79	Equal Variances Approximated	Unequal variances Calculated	Design Effect Corrected
Medical Counselling	12.28	22.23	81.0	23.09***	12.43***	7.96***
Physiotherapy	2.21	3.07	38.9	4.64***	2.91***	1.96**
Injections	13.76	9.59	-30.3	10.99***	7.17***	5.50***
Limited Exam/History	51.32	63.03	22.8	20.30***	11.63***	7.66***
ECG	3.38	2.74	-18.9	3.15***	2.42**	1.18
Immunizations/ Desensitization	4.53	5.19	14.6	2.63**	1.58	1.27
X-rays	7.35	8.24	12.1	2.85***	2.34**	1.34
Endoscopy	1.18	1.32	11.9	1.08	0.64	0.43
Office Surgery	6.69	7.37	10.2	2.28**	1.85*	1.20
Blood Pressure	33.15	36.04	8.7	5.20***	2.55**	1.64
Therapeutic Listening/ Psychotherapy	4.27	4.44	4.0	0.71	0.31	0.14
Prescription Drugs	44.31	46.80	3.4	4.27***	1.78*	1.10
Length of Visit (minutes)	14.49	14.93	3.0	--	1.57	0.75
Design Effect (K)	2.68	1.84				

***Significant at one percent level.
**Significant at five percent level.
*Significant at ten percent level.

where S_a^2 is the approximate variance, (as defined here),* N_j is the number of observations, $\overline{X}$ is the percent of visits for which a given service is performed, V is the number of physician visits in the universe (in thousands) and the j subscript refers to the year (j = 1 for 1975 and j = 2 for 1979). For 1975 Z_1 = 44.6697 and V_1 = 567,600, and for 1979 Z_2 = 32.48 and V_2 = 556,300. Substituting these values** into (A-1) we obtain shorthand expressions for the approximate variance in each year:

$$\frac{S_{1a}^2}{N_1} = 7.870 \cdot 10^{-5} (\overline{X}_1)(1-\overline{X}_1) \qquad \text{(A-2)}$$

$$\frac{S_{2a}^2}{N_2} = 5.839 \cdot 10^{-5} (\overline{X}_2)(1-\overline{X}_2) \qquad \text{(A-3)}$$

Following Ezzati and McLemore, who state that "the standard error of a difference is approximately the square root of the sum of the square of each standard error considered separately" (p. 44), and remembering the differences in definition of the standard error, we can use the following t-statistic t_a to compare each pair of means:

$$t_a = \frac{\left[\overline{X}_1 - \overline{X}_2\right]}{\sqrt{\frac{S_{1a}^2}{N_1} + \frac{S_{2a}^2}{N_2}}} \qquad \text{(A-4)}$$

*Note that Ezzati and McLemore define "variance" by S_a^2/N, whereas in this appendix variance is defined as S^2 alone.

**The 1975 value for Z was taken from Office Visits to Internists, Vital and Health Statistics Series 13, number 36, p. 53. The 1979 value for Z was calculated from Advancedata, National Center for Health Statistics, number 66, Table III using equation A-1. The V_i came from the NAMCS data tapes.

where t_a has $(N_1 + N_2 - 2)$ degrees of freedom. The approximate t-statistics computed by the Ezzati-McLemore method may be seen in column 4 of Table A-1. Ten of the twelve* variables have statistically significant differences between their 1975 and 1979 values, according to this method. For prescription drugs a 3.4 percentage difference was found to be significant at the 1% level.

The second approach uses the the ordinary summary statistics forthcoming during our analysis for the main body of this report. The variance is calculated according to the following:

$$S_j^2 = \frac{\left(\frac{\sum_i W_{ji}^2 \; Y_{ji}^2}{N_j \; \bar{W}_j^2}\right) - \bar{Y}_j^2}{N_j \; (N_j - 1)} \qquad \text{(A-5)}$$

where W_i is the weight applied to each individual doctor observation, Y_i is an individual observation for the i^{th} physician, $\bar{W}_j$ is the average weight applied to a physician in the NAMCS sample, and $\bar{Y}_j$ is the mean of the unweighted observations. S_j^2 is what we call the calculated variance for a given mean in year j and it is based on the normalized weighted observations.**

Performing an F-test*** on these calculated variances gives the result that all the calculated variances differ significantly from 1975 to 1979. Equation (A-4) is still appropriate except that S_j^2 must be substituted for S_a^2, and the degrees of freedom are now equal to:

---

*Length of visit is excluded from these calculations because a slightly different formula is required for comparisons involving absolute rather than percentages.

**The normalized weight for each physician observation is $W_{ji}/(N_j \cdot \bar{W}_j)$.

***The F-statistic equals $\max\left(\frac{S_1^2}{S_2^2}, \frac{S_2^2}{S_1^2}\right)$ with degrees of freedom equal to $(N_1\text{-}1,\ N_2\text{-}1)$ if S_1^2/S_2^2 exceeds unity and equal to $(N_2\text{-}1,\ N_1\text{-}1)$ if this condition is not met. For the corrected variance S_{jc}^2 (see below) the test is the same except that K_j is substituted for unity in the freedom calculated.

$$df = \frac{(S_1^2 + S_2^2)^2}{\frac{S_1^2}{N_1-1} + \frac{S_2^2}{N_2-1}} \tag{A-6}$$

The calculated t-statistics, assuming unequal, weighted variances, may be seen in Column 5 of Table A-1. As compared to the Ezzati-McLemore approximation, the calculated t-statistics are smaller and therefore give a wider range of significance levels. However, only one variable difference found to be significant under the first method is deemed insignificant under the second; the results of the two methods may therefore be judged quite similar.

The accuracy of these t-statistics can only be gauged by reference to the third mode of calculation, which produces fully corrected test statistics adjusted for the design effect. The magnitude of the design effect K_j is computed by:

$$K_j = \frac{N_j \sum_i W_{ji}^2}{\left(\sum_i W_{ji}\right)^2} \tag{A-7}$$

If the weights W_i were equal (as in a perfectly proportionate sample), K would be equal to unity and the correction for the design effect would be zero. This may be seen using the formula for the fully corrected variance S_c^2:

$$\frac{S_{jc}^2}{N_j} = \frac{K_j S_{ju}^2}{N_j} \tag{A-8}$$

where S_u^2 is the variance of the unweighted observations at the physician level. Equation (A-4) can still be used to calculate the t-statistic except that the S_{jc}^2 are substituted for the S_j^2.* Since $K > 1$ if the sample is <u>not</u> perfectly proportionate, our corrected variances are greater than

---

*All formulas for the design effect are taken from Granneman <u>et</u> <u>al</u>., Appendix B. Note that this is also true for the degrees of freedom formula (A-6), with the additional correction that N_j-1 becomes N_j-K.

the calculated ones, and the t-statistics (and significance levels) are accordingly reduced. The actual K_j are 2.68 and 1.84 for the years 1975 and 1979, respectively.** These design effects are important for our present purposes, as can be seen by comparing the last and next-to-last columns of Table A-1. The differences between the corrected and calculated t-statistics are quite large, ranging from 0.17 to 3.97. Levels of significance between these two methods are altered to an important extent for six of our thirteen variables. Five of the nine differences judged to be significant using calculated variances fade into insigificance when using the corrected method. All differences in means exceeding 22 percent were found to be significant, even after allowing for the design effect, while no differences less than this achieved significance at conventional levels.*** This, perhaps, may be considered as an approximate indicator of the precision of comparisons involving year to year differences.

It appears that the correction of variances for design error is indeed important. The t-statistics using corrected variances was between 24 and 55 percent less than the uncorrected t-statistic, and between 47 and 80 percent less than the approximate t-statistic. This was enough in six of thirteen cases to change the level of significance appreciably.

As far as conventional statistical tests go, the last column of Table A-1 is about the best we can do. However, there is still another point that must be taken into consideration before interpreting even the corrected t-statistics as representing real <u>trend</u> differences, or the lack thereof, over time. Annual variations in administering the survey questions and picking the sample can result in a varying degree of bias over time. Therefore, picking any one year as <u>the</u> endpoint for a data series is a hazardous proposition in that choice of the next year or the previous one can alter the results of significance testing. Variables that exhibit erratic, "bouncing" behavior over time have been omitted from Table A-1, so that our results can be interpreted at face value. To extend the analysis to another variable list, it would be better to use some technique that smooths the time series automatically (e.g., regression analysis), essentially considering all data points simultaneously.

---

* This may be compared to a K of 1.54 found by Grannemann <u>et al</u>., (<u>An Analysis of Content ot office Visits Provided By NHSC and Private Sector Physicians</u>) for 1979. They used a more homogeneous sample of rural physicians, which would be expected to reduce K.

** Recall that under the Ezzati-McLemore approximation a difference of 3.4 percent was found to be statistically significant in one instance.

APPENDIX B

NAMCS QUESTIONNAIRES:
1974 - 1981

ASSURANCE OF CONFIDENTIALITY—All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose.

D650459

PATIENT RECORD
NATIONAL AMBULATORY MEDICAL CARE SURVEY

1. DATE OF VISIT

Mo / Day / Yr

2. DATE OF BIRTH

Mo / Day / Yr

3. SEX

1 ☐ FEMALE
2 ☐ MALE

4. COLOR OR RACE

1 ☐ WHITE
2 ☐ NEGRO/BLACK
3 ☐ OTHER
4 ☐ UNKNOWN

5. PATIENT'S PRINCIPAL PROBLEM(S) COMPLAINT(S), OR SYMPTOM(S) THIS VISIT
(In patient's own words)

a. MOST IMPORTANT ____________

b. OTHER ____________

6. SERIOUSNESS OF PROBLEM IN ITEM 5a *(Check one)*

1 ☐ VERY SERIOUS
2 ☐ SERIOUS
3 ☐ SLIGHTLY SERIOUS
4 ☐ NOT SERIOUS

7. HAVE YOU EVER SEEN THIS PATIENT BEFORE?

1 ☐ YES 2 ☐ NO

If YES, for the problem indicated in ITEM 5a?

1 ☐ YES 2 ☐ NO

8. MAJOR REASON(S) FOR THIS VISIT *(Check all major reasons)*

01 ☐ ACUTE PROBLEM
02 ☐ ACUTE PROBLEM, FOLLOW-UP
03 ☐ CHRONIC PROBLEM, ROUTINE
04 ☐ CHRONIC PROBLEM, FLARE-UP
05 ☐ PRENATAL CARE
06 ☐ POSTNATAL CARE
07 ☐ POSTOPERATIVE CARE
____________ *(Operative procedure)*
08 ☐ WELL ADULT/CHILD EXAM
09 ☐ FAMILY PLANNING
10 ☐ COUNSELING/ADVICE
11 ☐ IMMUNIZATION
12 ☐ REFERRED BY OTHER PHYS/AGENCY
13 ☐ ADMINISTRATIVE PURPOSE
14 ☐ OTHER *(Specify)* ____________

9. PHYSICIAN'S PRINCIPAL DIAGNOSIS THIS VISIT

a. DIAGNOSIS ASSOCIATED WITH ITEM 5a ENTRY
____
____

b. OTHER SIGNIFICANT CURRENT DIAGNOSES *(In order of importance)*
____
____

10. TREATMENT/SERVICE ORDERED OR PROVIDED THIS VISIT *(Check all that apply)*

01 ☐ NONE ORDERED/PROVIDED
02 ☐ GENERAL HISTORY/EXAM
03 ☐ LAB PROCEDURE/TEST
04 ☐ X-RAYS
05 ☐ INJECTION/IMMUNIZATION
06 ☐ OFFICE SURGICAL TREATMENT
(Specify) ____________
07 ☐ PRESCRIPTION DRUG
08 ☐ NON-PRESCRIPTION DRUG
09 ☐ PSYCHOTHERAPY/THERAPETUIC LISTENING
10 ☐ MEDICAL COUNSELING/ADVICE
11 ☐ OTHER *(Specify)* ____________

11. DISPOSITION THIS VISIT *(Check all that apply)*

1 ☐ NO FOLLOW-UP PLANNED
2 ☐ RETURN AT SPECIFIED TIME
3 ☐ RETURN IF NEEDED, P.R.N.
4 ☐ TELEPHONE FOLLOW-UP PLANNED
5 ☐ REFERRED TO OTHER PHYSICIAN/AGENCY
6 ☐ RETURNED TO REFERRING PHYSICIAN
7 ☐ ADMIT TO HOSPITAL
8 ☐ OTHER *(Specify)* ____________

12. DURATION OF THIS VISIT *(Time actually spent with physician)*

____________ MINUTES

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REV. 4-73

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION
NATIONAL CENTER FOR HEALTH STATISTICS

O.M.B. #68-S72106
EXPIRATION DATE 6/30/75

1975-1976 QUESTIONNAIRE

ASSURANCE OF CONFIDENTIALITY — All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose.

B № 881078

PATIENT RECORD
NATIONAL AMBULATORY MEDICAL CARE SURVEY

1. DATE OF VISIT
___/___/___ Mo / Day / Yr

2. DATE OF BIRTH
___/___/___ Mo / Day / Yr

3. SEX
1 ☐ FEMALE
2 ☐ MALE

4. COLOR OR RACE
1 ☐ WHITE
2 ☐ NEGRO/BLACK
3 ☐ OTHER
4 ☐ UNKNOWN

5. PATIENT'S PRINCIPAL PROBLEM(S) COMPLAINT(S), OR SYMPTOM(S) THIS VISIT *(In patient's own words)*
a MOST IMPORTANT ____________
b OTHER ____________

6. SERIOUSNESS OF PROBLEM IN ITEM 5a *(Check one)*
1 ☐ VERY SERIOUS
2 ☐ SERIOUS
3 ☐ SLIGHTLY SERIOUS
4 ☐ NOT SERIOUS

7. HAVE YOU EVER SEEN THIS PATIENT BEFORE?
1 ☐ YES 2 ☐ NO
If YES, for the problem indicated in ITEM 5a?
1 ☐ YES 2 ☐ NO

8. MAJOR REASON(S) FOR THIS VISIT *(Check all major reasons)*
01 ☐ ACUTE PROBLEM
02 ☐ ACUTE PROBLEM, FOLLOW-UP
03 ☐ CHRONIC PROBLEM, ROUTINE
04 ☐ CHRONIC PROBLEM, FLARE-UP
05 ☐ PRENATAL CARE
06 ☐ POSTNATAL CARE
07 ☐ POSTOPERATIVE CARE
____________ *(Operative procedure)*
08 ☐ WELL ADULT/CHILD EXAM
09 ☐ FAMILY PLANNING
10 ☐ COUNSELING/ADVICE
11 ☐ IMMUNIZATION
12 ☐ REFERRED BY OTHER PHYS/AGENCY
13 ☐ ADMINISTRATIVE PURPOSE
14 ☐ OTHER *(Specify)*
____

9. PHYSICIAN'S PRINCIPAL DIAGNOSIS THIS VISIT
a DIAGNOSIS ASSOCIATED WITH ITEM 5a ENTRY
____
____
b OTHER SIGNIFICANT CURRENT DIAGNOSES *(In order of importance)*
____
____

10. DIAGNOSTIC/THERAPEUTIC SERVICES ORDERED/PROVIDED THIS VISIT *(Check all that apply)*
01 ☐ NONE
02 ☐ LIMITED HISTORY/EXAM
03 ☐ GENERAL HISTORY/EXAM
04 ☐ CLINICAL LAB. TEST
05 ☐ BLOOD PRESSURE CHECK
06 ☐ EKG
07 ☐ HEARING TEST
08 ☐ VISION TEST
09 ☐ ENDOSCOPY
10 ☐ OFFICE SURGERY
11 ☐ DRUG PRESCRIBED OR DISPENSED
12 ☐ X-RAY
13 ☐ INJECTION
14 ☐ IMMUNIZATION/DESENSITIZATION
15 ☐ PHYSIOTHERAPY
16 ☐ MEDICAL COUNSELING
17 ☐ PSYCHOTHERAPY/THERAPEUTIC LISTENING
18 ☐ OTHER *(Specify)* ____________
____

11. DISPOSITION THIS VISIT *(Check all that apply)*
1 ☐ NO FOLLOW-UP PLANNED
2 ☐ RETURN AT SPECIFIED TIME
3 ☐ RETURN IF NEEDED, P.R.N.
4 ☐ TELEPHONE FOLLOW-UP PLANNED
5 ☐ REFERRED TO OTHER PHYSICIAN/AGENCY
6 ☐ RETURNED TO REFERRING PHYSICIAN
7 ☐ ADMIT TO HOSPITAL
8 ☐ OTHER *(Specify)* ____________

12. DURATION OF THIS VISIT *(Time actually spent with physician)*
________ MINUTES

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH RESOURCES ADMINISTRATION
NATIONAL CENTER FOR HEALTH STATISTICS

1977-1978 QUESTIONNAIRE

ASSURANCE OF CONFIDENTIALITY—All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose.

C444121

PATIENT RECORD
NATIONAL AMBULATORY MEDICAL CARE SURVEY

1. DATE OF VISIT
___/___/___ Mo/Day/Yr

2. DATE OF BIRTH
___/___/___ Mo/Day/Yr

3. SEX
1 ☐ FEMALE
2 ☐ MALE

4. COLOR OR RACE
1 ☐ WHITE
2 ☐ NEGRO/BLACK
3 ☐ OTHER
4 ☐ UNKNOWN

5. WAS PATIENT REFERRED FOR THIS VISIT BY ANOTHER PHYSICIAN?
1 ☐ YES
2 ☐ NO

6. PATIENT'S COMPLAINT(S), SYMPTOM(S), OR OTHER REASON(S) FOR THIS VISIT *(In patient's own words)*
a. MOST IMPORTANT ______
b. OTHER ______

7. TIME SINCE ONSET OF COMPLAINT/SYMPTOM IN ITEM 6a *(Check one)*
1 ☐ LESS THAN 1 DAY
2 ☐ 1-6 DAYS
3 ☐ 1-3 WEEKS
4 ☐ 1-3 MONTHS
5 ☐ MORE THAN 3 MONTHS
6 ☐ NOT APPLICABLE

8. PHYSICIAN'S DIAGNOSES
a. PRINCIPAL DIAGNOSIS/PROBLEM ASSOCIATED WITH ITEM 6a
______
b. OTHER SIGNIFICANT CURRENT DIAGNOSES
______
______

9. HAVE YOU SEEN PATIENT BEFORE?
1 ☐ YES 2 ☐ NO
IF YES, FOR THE CONDITION IN ITEM 8a?
1 ☐ YES 2 ☐ NO

10. SERIOUSNESS OF CONDITION IN ITEM 8a *(Check one)*
1 ☐ VERY SERIOUS
2 ☐ SERIOUS
3 ☐ SLIGHTLY SERIOUS
4 ☐ NOT SERIOUS

11. DIAGNOSTIC SERVICES THIS VISIT *(Check all ordered or provided)*
1 ☐ NONE
2 ☐ LIMITED EXAM/HISTORY
3 ☐ GENERAL EXAM/HISTORY
4 ☐ PAP TEST
5 ☐ CLINICAL LAB TEST
6 ☐ X-RAY
7 ☐ EKG
8 ☐ VISION TEST
9 ☐ ENDOSCOPY
10 ☐ BLOOD PRESSURE CHECK
11 ☐ OTHER *(Specify)* ______

12. THERAPEUTIC SERVICES THIS VISIT *(Check all ordered or provided)*
1 ☐ NONE
2 ☐ IMMUNIZATION/DESENSITIZATION
3 ☐ DRUGS (PRESCRIPTION/NONPRESCRIPTION)
4 ☐ DIET COUNSELING
5 ☐ FAMILY PLANNING
6 ☐ MEDICAL COUNSELING
7 ☐ PHYSIOTHERAPY
8 ☐ OFFICE SURGERY
9 ☐ PSYCHOTHERAPY/THERAPEUTIC LISTENING
10 ☐ OTHER *(Specify)* ______

13. DISPOSITION THIS VISIT *(Check all that apply)*
1 ☐ NO FOLLOW-UP PLANNED
2 ☐ RETURN AT SPECIFIED TIME
3 ☐ RETURN IF NEEDED, P.R.N.
4 ☐ TELEPHONE FOLLOW-UP PLANNED
5 ☐ REFERRED TO OTHER PHYSICIAN
6 ☐ RETURNED TO REFERRING PHYSICIAN
7 ☐ ADMIT TO HOSPITAL
8 ☐ OTHER *(Specify)* ______

14. DURATION OF THIS VISIT *(Time actually spent with physician)*
______ MINUTES

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH RESOURCES ADMINISTRATION
NATIONAL CENTER FOR HEALTH STATISTICS

1979 QUESTIONNAIRE

ASSURANCE OF CONFIDENTIALITY — All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purpose of the survey and will not be disclosed or released to other persons or used for any other purpose

D 718478

1. DATE OF VISIT

Mo. / Day / Yr.

PATIENT RECORD
NATIONAL AMBULATORY MEDICAL CARE SURVEY

2. DATE OF BIRTH

Mo. / Day / Yr.

3. SEX
1 ☐ FEMALE
2 ☐ MALE

4. COLOR OR RACE
1 ☐ WHITE
2 ☐ BLACK
3 ☐ ASIAN/PACIFIC ISLANDER
4 ☐ AMERICAN INDIAN/ ALASKAN NATIVE

5. ETHNICITY
1 ☐ HISPANIC ORIGIN
2 ☐ NOT HISPANIC

6. WAS PATIENT REFERRED FOR THIS VISIT BY ANOTHER PHYSICIAN?
1 ☐ YES
2 ☐ NO

7. PATIENT'S COMPLAINT(S), SYMPTOM(S), OR OTHER REASON(S) FOR THIS VISIT
(In patient's own words)
a. MOST IMPORTANT ______
b. OTHER ______

8. MAJOR REASON FOR THIS VISIT
(Check One)
1 ☐ ACUTE PROBLEM
2 ☐ CHRONIC PROBLEM, ROUTINE
3 ☐ CHRONIC PROBLEM, FLAREUP
4 ☐ POST SURGERY/ INJURY
5 ☐ NON-ILLNESS CARE (ROUTINE PRENATAL, GENERAL EXAM, WELL BABY, ETC.)

9. PHYSICIAN'S DIAGNOSES
a. PRINCIPAL DIAGNOSIS/PROBLEM ASSOCIATED WITH ITEM 7a
b. OTHER SIGNIFICANT CURRENT DIAGNOSES

10. HAVE YOU SEEN PATIENT BEFORE?
1 ☐ YES 2 ☐ NO
IF YES, FOR THE CONDITION IN ITEM 9a?
1 ☐ YES 2 ☐ NO

11. DIAGNOSTIC SERVICES THIS VISIT
(Check all ordered or provided)
1 ☐ NONE
2 ☐ LIMITED HISTORY/EXAM
3 ☐ GENERAL HISTORY/EXAM
4 ☐ PAP TEST
5 ☐ CLINICAL LAB TEST
6 ☐ X-RAY
7 ☐ BLOOD PRESSURE CHECK
8 ☐ EKG
9 ☐ VISION TEST
10 ☐ ENDOSCOPY
11 ☐ MENTAL STATUS EXAM
12 ☐ OTHER (Specify) ______

12. THERAPEUTIC SERVICES THIS VISIT
(Check all ordered or provided)
1 ☐ NONE
2 ☐ DRUG (PRESCRIPTION)
3 ☐ DRUG (NONPRESCRIPTION)
4 ☐ INJECTION
5 ☐ IMMUNIZATION/ DESENSITIZATION
6 ☐ DIET COUNSELING
7 ☐ FAMILY PLANNING
8 ☐ MEDICAL COUNSELING
9 ☐ PHYSIOTHERAPY
10 ☐ OFFICE SURGERY
11 ☐ PSYCHOTHERAPY/ THERAPEUTIC LISTENING
12 ☐ OTHER (Specify) ______

13. DISPOSITION THIS VISIT
(Check all that apply)
1 ☐ NO FOLLOW-UP PLANNED
2 ☐ RETURN AT SPECIFIED TIME
3 ☐ RETURN IF NEEDED, P.R.N.
4 ☐ TELEPHONE FOLLOW-UP PLANNED
5 ☐ REFERRED TO OTHER PHYSICIAN
6 ☐ RETURNED TO REFERRING PHYSICIAN
7 ☐ ADMIT TO HOSPITAL
8 ☐ OTHER (Specify) ______

14. DURATION OF THIS VISIT
(Time actually spent with physician)
______ MINUTES

15. IS THE REASON FOR THIS VISIT?
(Check one)
1 ☐ ACCIDENTAL INJURY (Answer 16-19)
2 ☐ PRODUCT RELATED ILLNESS (Answer 16-19)
3 ☐ NEITHER OF THE ABOVE → STOP (Go to next patient)

16. DESCRIBE ALL OBJECTS, PRODUCTS, OR SUBSTANCES INVOLVED IN THE ACCIDENT OR PRODUCT RELATED ILLNESS
(Be Specific)

17. LOCATION OF ACCIDENT OR EXPOSURE TO PRODUCT
(Check One)
1 ☐ PRIVATE RESIDENCE
2 ☐ ELSEWHERE (Specify) ______
3 ☐ UNKNOWN

18. WAS PATIENT AT WORK, JOB OR BUSINESS WHEN ACCIDENT OR EXPOSURE OCCURRED?
1 ☐ YES
2 ☐ NO
3 ☐ UNKNOWN

19. WAS PATIENT PREVIOUSLY TREATED FOR THIS CONDITION?
(Check all that apply)
1 ☐ NO
2 ☐ YES - HOSPITAL EMERGENCY ROOM
3 ☐ YES - PRIVATE PHYSICIAN'S OFFICE
4 ☐ YES - PHYSICIAN ELSEWHERE (Specify) ______
5 ☐ YES - PLACE UNKNOWN
6 ☐ UNKNOWN

PHS 6105 D
Rev. 11/78

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
PUBLIC HEALTH SERVICE
NATIONAL CENTER FOR HEALTH STATISTICS

O.M.B. #68-R1498

D 749606

PATIENT LOG

As each patient arrives, record name and time of visit on the log below. For the patient entered on line #5, also complete the patient record to the right.

PATIENT'S NAME	TIME OF VISIT
1	a.m. / p.m.
2	a.m. / p.m.
3	a.m. / p.m.
4	a.m. / p.m.
5 Record items 1-15 for this patient.	a.m. / p.m.

CONTINUE LISTING PATIENTS ON NEXT PAGE

ASSURANCE OF CONFIDENTIALITY—All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose.

Department of Health and Human Services
Public Health Service
Office of Health Research, Statistics, and Technology
National Center for Health Statistics

D 749606

PATIENT RECORD
NATIONAL AMBULATORY MEDICAL CARE SURVEY

1. DATE OF VISIT ___/___/___ Month Day Year

2. DATE OF BIRTH ___/___/___ Month Day Year

3. SEX
1 ☐ FEMALE
2 ☐ MALE

4. COLOR OR RACE
1 ☐ WHITE
2 ☐ BLACK
3 ☐ ASIAN/PACIFIC ISLANDER
4 ☐ AMERICAN INDIAN/ ALASKAN NATIVE

5. ETHNICITY
1 ☐ HISPANIC ORIGIN
2 ☐ NOT HISPANIC

6. PATIENT'S COMPLAINT(S), SYMPTOM(S), OR OTHER REASON(S) FOR THIS VISIT *[In patient's own words]*
a. MOST IMPORTANT
b. OTHER

7. MAJOR REASON FOR THIS VISIT *[Check one]*
1 ☐ ACUTE PROBLEM
2 ☐ CHRONIC PROBLEM, ROUTINE
3 ☐ CHRONIC PROBLEM, FLAREUP
4 ☐ POST SURGERY/POST INJURY
5 ☐ NON-ILLNESS CARE (ROUTINE PRENATAL, GENERAL EXAM., WELL BABY, ETC.)

8. DIAGNOSTIC SERVICES THIS VISIT *[Check all ordered or provided]*
1 ☐ NONE
2 ☐ LIMITED HISTORY/EXAM.
3 ☐ GENERAL HISTORY/EXAM.
4 ☐ PAP TEST
5 ☐ CLINICAL LAB TEST
6 ☐ X-RAY
7 ☐ BLOOD PRESSURE CHECK
8 ☐ EKG
9 ☐ VISION TEST.
10 ☐ ENDOSCOPY
11 ☐ MENTAL STATUS EXAM.
12 ☐ OTHER *(Specify)*

9. PHYSICIAN'S DIAGNOSES
a. PRINCIPAL DIAGNOSIS/PROBLEM ASSOCIATED WITH ITEM 6a.
b. OTHER SIGNIFICANT CURRENT DIAGNOSES

10. HAVE YOU SEEN PATIENT BEFORE?
1 ☐ YES 2 ☐ NO
IF YES, FOR THE CONDITION IN ITEM 9a?
1 ☐ YES 2 ☐ NO

11. MEDICATION THERAPY THIS VISIT ☐ NONE
[Using brand or generic names, record all new and continued medications ordered, injected, administered, or otherwise provided at this visit. Include immunizing and desensitizing agents]

a. FOR PRINCIPAL DIAGNOSES IN ITEM 9a.	b. FOR ALL OTHER REASONS
1.	1.
2.	2.
3.	3.
4.	4.

12. NON-MEDICATION THERAPY *[Check all services ordered or provided this visit]*
1 ☐ NONE
2 ☐ PHYSIOTHERAPY
3 ☐ OFFICE SURGERY
4 ☐ FAMILY PLANNING
5 ☐ PSYCHOTHERAPY/ THERAPEUTIC LISTENING
6 ☐ DIET COUNSELING
7 ☐ FAMILY/SOCIAL COUNSELING
8 ☐ MEDICAL COUNSELING
9 ☐ OTHER *(Specify)*

13. WAS PATIENT REFERRED FOR THIS VISIT BY ANOTHER PHYSICIAN?
1 ☐ YES
2 ☐ NO

14. DISPOSITION THIS VISIT *[Check all that apply]*
1 ☐ NO FOLLOW-UP PLANNED
2 ☐ RETURN AT SPECIFIED TIME
3 ☐ RETURN IF NEEDED, P.R.N.
4 ☐ TELEPHONE FOLLOW-UP PLANNED
5 ☐ REFERRED TO OTHER PHYSICIAN
6 ☐ RETURNED TO REFERRING PHYSICIAN
7 ☐ ADMIT TO HOSPITAL
8 ☐ OTHER *(Specify)*

15. DURATION OF THIS VISIT *[Time actually spent with physician]*
_____ Minutes

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